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Some Sanitary Reports.

A RECENT number of the *Journal of the Society of Arts* contains the report in full of Mr. Chadwick's Presidential Address to the Association of Sanitary Inspectors of Great Britain, delivered at Brighton on the 25th of last month, and to which reference has already been made in our columns. The lesson read by the veteran sanitarian in this address is the one which he has been delivering all his life, and which he still keeps persistently pressing upon a generation which has profited much, doubtless, by the preaching of himself and other devoted sanitarians, but which is still far short of the mark, if not in regard to sanitary belief, at least in regard to sanitary practice. Two points strike us especially in Mr. Chadwick's address as affording remarkable and dramatic examples of the moral and physical effect of sanitary conditions on human life and character, for evil or for good. One is the incident which he mentions of his conversation with a respectable member of the poorer classes in Edinburgh, a porter earning 20s. a week, and who stated to the sanitary apostle the details of his expenditure, resulting in an admission that one half of it went on whisky. In answer to a remonstrance, the reply was, "Well, sir, this is the only place I could get; and if you were to live here you would drink whisky too." "It so happened," adds Mr. Chadwick, "that whilst I was there I did feel a coppery taste in my mouth, a premonitory symptom from so depressing an atmosphere, and immediately I left it, it is the fact that, rightly or wrongly, I sought correction in a diffusive stimulant—some warm brandy and water." So much for the demoralising effect of insanitary habitations. An equally striking, but pleasanter, testimony to the importance of sanitation,—"a more sounder instance,"—is found on the next page of the same address. The speaker, in visiting schools in a neighbourhood where he had not been for some years, was much struck with the appearance of the children, as less pallid and without the "dull leathery look" that he used to see. And he observed to the manager, "You must have got a new class of children since my last visit." No, was the answer, but "since the sanitary improvements had been made in the lower districts," the children received from them had the improved type which had struck the visitor. Premises had been drained, rooms ventilated, washing promoted, and the death-rate reduced to one-fourth of what it had formerly been, and that with children of the lowest class, with the physical and moral results written on their faces and manners.

This is an old story, it may be said; but it is one which cannot be let go even yet. Great is the progress that has been made in public opinion and in practical reform during the last quarter of a century; but those who keep their eyes about them are continually reminded how much there is yet to be done.

Among such reminders are the various "Reports" which reach us from time to time, made to the Local Government Board by medical officers, in regard to the sanitary state of this or that village or township, and the probable causes of the prevalence of enteric fever and other epidemics in such localities. The facts stated and the conclusions arrived at in these official reports are worthy of more public attention than they usually receive. We have before us all that we have received since the commencement of the present year, and they contain some instructive reading.

The largest and, in other respects, the most important of these, and also the earliest in date of our collection, is the joint report made to the Local Government Board by Dr. Barry and Mr. P. Gordon Smith, in February of this year, on the subject of back-to-back houses. So long and so decisively has this method of building houses been condemned by sanitarians, that it may come as a surprise to many to know that there are whole districts, including towns of such importance as Leeds and Halifax, where not only are back-to-back houses permitted, but there is a system of local legislation for them, and a decided tendency on the part not only of the builders but the occupiers of them, to prefer them to "through houses." The preference of the speculating builder for them is, of course, on the ground of economy of building; but the statistics given by Dr. Barry and Mr. Smith go to show that this economy is of the barest character, often only representing one penny in the week of rent. The statistics on this subject are given very fully and precisely, in well-arranged tables of outlay, area, and return, which should form powerful arguments in the hand of the right-minded sanitarian, showing for how poor a return this injury to public health is perpetrated. To the statistics of injury to health we will come just now. The preference with which the back-to-back houses are apparently regarded by a certain proportion of the occupiers arises from a persuasion that they are "more comfortable" than "through houses"; on the principle, we presume, enunciated in the proverb of the Scotch lower orders, quoted in "The Antiquary":—"The clartier* the cosier,"—a sentiment equally acted on in England, if not so frankly proclaimed. Who has not experienced the difficulty of persuading persons of the lowest rank to keep windows open in their houses, and the certainty with which they will, if possible, stop up all ventilators which a paternal landlord may have established for their welfare? To such persons a good stuffy back-to-back house, where all the windows are one side only, and where no breath of fresh air can invade them from the other side, is a paradise, from which only a stern and inexorable legislation,—a sword of the law which turns every way,—can eject them.

The Report deals entirely with certain towns in Yorkshire. Whether this district was selected as being one specially in need of criticism, or for other reasons, we do not learn from the report. The statistics given are under the heads of (1) extent to which back-to-back houses have been built recently; (2) space about dwellings, and density in regard to area; (3) structural arrangements, ventilation, disposal of refuse, &c.; (4) relative cost of houses of different classes; and (5) influence of different classes of houses upon health and morality. The statistics under the first head will astonish the London reader. In Halifax, in the years 1876 to 1886, 61 per cent. of the houses built were on the back-to-back plan! In Morley, where by-laws allowing of the erection of such houses have been in force since 1883, 82 per cent. have been built so, and the proportion is increasing. In Leeds, during the twelve years ending August, 1887, about 50,000 persons are estimated to have been living in back-to-back houses; and in Bradford, during 1876 to 1886, out of a total of 7,036 new houses certified in Bradford as fit for habitation, 64 per cent. were built on the back-to-back plan, inhabited by about 20,000 persons. We ought to be very much indebted to Dr. Barry and Mr. Gordon Smith for

I.e., "dirtier."

investigating and tabulating these facts, which to many will seem almost incredible. It only shows how slow is the progress in these matters, that years after the best sanitary authorities have condemned such houses completely,—after the condemnation of them has really become quite a commonplace,—there are large provincial towns building them wholesale, and even passing by-laws to permit and to regulate their construction. This latter fact is almost the worst part of the matter. It would look better if such building were the result of mere evasion of the law, or carelessness in the administration of it, than that the law should deliberately license it. In Halifax it appears, indeed, that the town authorities almost revel in back-to-back houses, and that while the by-laws specify certain restrictions, the practice is to relax them. The by-laws contemplate that back-to-back houses should be limited to blocks of eight houses, four each way, with 15 ft. clear space between them and the next block, and that this rule should not be departed from "unless with the previous consent of the Corporation." This dispensing power of the Corporation seems, however, to have been so freely exercised that the authors of the Report are able to exhibit block plans of back-to-back houses in blocks of 16, 28, and 30 houses respectively, and a block of no less than 20 "single" houses, as they are called, *i.e.*, houses with only a dead wall at the back, and no through ventilation.

At Keighley, which is another of the back-to-back towns, as we may call them, it appears that the building of such houses is limited, in by-law and in fact, to blocks of four tenements, and there is a certain practical character in the way in which the system is carried out there. The four houses are within the four arms of a cross formed by the party-walls, and while the window of each living room looks, we will say, to east or west, the window of each scullery or of the smaller bedroom above looks to north or south; so that there is at least a cross-corner ventilation. This practice (usual, it appears, though not always enforced) does away with some of the evil of the back-to-back system, and the builder of the houses "makes his economies," as the French would put it, without rendering each house a complete *cul-de-sac* of fouled air; so that in as far as this, Keighley is in advance of her larger neighbours among the Yorkshire towns.

The manner in which the effort to save, which is the sole excuse for this method of building, is carried on in many cases, is worth special note, and we may transcribe it here as given in the Report:—

"In the case of a row of through houses, every house, except the two end houses, will be concerned with two party walls and two external walls; but in the case of a row of back-to-back houses, each house, other than the four end ones, will be concerned with three party walls, and only one external wall. Hence, any saving that can be effected in the construction of the party walls of new buildings will produce a larger saving in the case of back-to-back houses than of through houses. This particular item of saving of cost has, we think, tended considerably to create the impression that back-to-back houses are cheaper of construction, and can, therefore, be let at lower rents than through houses affording the same amount of accommodation. There is, accordingly, a tendency in certain places to construct party walls only half a brick (4½ in.) in thickness, and to carry them up no higher than is absolutely necessary to separate the rooms in one house from the rooms in the next house, *i.e.*, up to the ceiling-joists of the top story, so that in a row of houses the space in the roof above the ceilings of the top story of the houses is continuous from one end of the row to the other. For similar reasons of economy the timbers of the several floors, and certain timbers of the roof, are frequently built into the party walls in such a way that the ends of joists and roof timbers, inserted on opposite sides of the same wall, are in close proximity to, if not in actual contact with, each other. Now, a brick party wall only 4½ in. thick cannot be regarded as affording reasonable safety against the spread of fire, and still less can any party wall be so regarded if it be incomplete in height, or if it in any way allow the timbers of floors and roofs to be continuous from one house to the next. Nor, indeed, can such party walls be regarded as sufficient for purposes of health, since, owing to incompleteness, the atmosphere of one house would be common to the other houses in the same row, a condition which could scarcely fail to be a source of danger in the case of any infectious disease; and yet it is by no means uncommon to find the party walls in rows of houses incomplete, being stopped short at the ceiling-joists of the top story, sometimes only 4½ in. thick, and very frequently with continuous timber through the party wall from one house to the next."

As if this were not enough, the arrangement of the privies in connexion with many of these houses is open to the gravest objection. In some cases, privies common to two or three houses are so placed as to be thirty or forty yards from some of the houses using them; in others they are against the very walls of the house itself.

The important point of such a report is, of course, when we come to the inquiry as to the effect of back-to-back houses on the health of the occupants. Common sense would lead most people to the conclusion that such houses cannot be so healthy as those with through ventilation; even the local authorities who permit this manner of building must be aware of this to a certain extent; but there is probably a vague idea that the ill-effects are over-rated, and that they will not show themselves in any decided or tangible form. That is the feeling which has been at the bottom of a great deal of the indifference and reluctance to undertake improvements which have retarded the sanitary advance of many places. People say, "Oh, we believe the statements about the disease and mortality resulting from these causes are greatly exaggerated"; and this belief suits so well with vested interests and official indolence that it is easily accepted. It is here that the almost unanswerable argument of statistics comes in with such effect. In regard to the districts specially dealt with in this report, the authors state that the data for such statistics are as yet wanting. They found in all the districts they visited a general opinion among the medical officers of health as to the unhealthiness of the back-to-back houses, but no systematic study and co-ordination of the facts seemed to have been made, such as would form the basis of a statistical statement. Since the inquiry was commenced, a resolution was passed in the Public Health Section of the British Medical Association, at their Dublin meeting, condemning the erection of back-to-back houses, but even on that occasion no definite evidence was adduced in support of the resolution. But the authors of the report were fortunate enough to obtain some definite statistics from another district, Salford, where Dr. Tatham, the Medical Officer of Health, had for some time been compiling statistics of the mortality and the conditions of building within the 208 districts of enumeration of the last census. From his information the authors have been able to supply some diagrams of mortality in the registration districts of Salford. In the first one taken, there are three districts, tabled thus:—

I. No back-to-back houses.
II. 18 per cent. ditto.
III. 50 per cent. ditto.

and two sets of graphic representations are given of the rates of mortality in these three groups of houses. The first set shows epidemic diseases, phthisis, and pulmonary diseases other than phthisis; the second set shows diarrhœa death-rates. In the first diagram the difference between the death-rates in column I. and column III. is sufficiently marked; it is as 26 to 37; but the difference is much more marked in the diarrhœa diagram, where it is as 15·5 to 28. The next table, from another district, presents a still more striking result, as it includes a fourth district, where the houses are all back-to-back. In this case the proportion of diarrhœa death-rate in the district (I.) where there are no back-to-back houses, and in that (IV.) where they are all back-to-back, is as 14 to 33. The authors admit that from the circumstance of the statistics being limited to one town, and there being no data as to the ages at death, too much stress must not be laid on the figures given; but the result, even in the rough, seems too marked to be passed over lightly, even allowing a certain margin for inaccuracies. The moral of the matter is that, while a district of one large town furnishes these results as to the effect of back-to-back house-building, other large towns are building more than half their number of new houses in the same manner.

Another important and very full report of the same kind is that furnished to the Local Government Board by Mr. John Spear, dated July 3, on an epidemic of enteric fever in the Mountain Ash Urban Sanitary District, Glamorganshire. This report was undertaken to trace the causes of epidemics in 1886 and 1887, and two plans of the district are given showing the blocks of houses in the contiguous hamlets of Mountain Ash and Miskin. These plans appear to bring out the relation between cause and effect in an almost startling manner. Houses infected are marked with red dots, and blocks of houses supplied with water from a particular main, the "Oxford-street main," running through Mountain Ash and on to Miskin, are coloured grey to distinguish them from the rest. With one or two exceptions in the second map, the red dots are all on the grey-tinted blocks of houses. The report is too long to go into in detail here; but the facts, as Mr. Spear says, show that the water passing through the Oxford-street main must have been, at various periods, contaminated with the specific poison of enteric fever. The precise manner in which this occurred has not been made out, but some facts are given which seem to show that the periodical intermission of the flow of water through this portion of the main, which was arranged to be shut off at intervals, gave at all events the opportunity for the formation of low forms of life in water stagnating in portions of the main, and also for leakage into the main, through defective joints, of some contamination from the soil around. We extract two or three of the most suggestive passages from the report. We may note that the infected district commenced (in Mountain Ash) at the point below a junction of the previously-mentioned main with the "Henry-street main":—

"The Oxford-street and Henry-street mains are so related that any air-borne matter gaining access to either of them during intermission of water-supply would probably be carried back some distance by the aspiratory action of the other, to the point of their bifurcation. Indeed, for some yards below that point, water will flow back from the Oxford-street into the Henry-street pipe, a fact that is made use of when it is desired to empty the former quickly.

For the purposes of this inquiry the two pipes were laid bare a little above and for some distance below the point indicated. . . . . The Henry-street pipe was laid some twenty-five years ago, and has been found to be much corroded. That of Oxford-street was relaid, as I have said, in 1885. There is no doubt that the relaying was very carelessly, not to say recklessly, done. Owing to the exigencies of water-supply, it was done mostly at night, and, the works being in private hands, was subject to no supervision on the part of any official or authority having concern with the public health. Accordingly, the main was carried, without any special precaution, immediately above, alongside, and even through old rubble drains; and when in the course of the trenching pipe-drains were cut through, no trouble appears to have been taken to replace them. I find the Inspector of Nuisances reporting in September, 1885, a third case of injury and stoppage of a drain from this cause.

Although the old stone culverts to which I have referred are not ostensibly sewage carriers now, they formed the sole sewage system some twenty years ago; and even now refuse matters are often poured, as I saw myself, into the roadside gullies that are connected with them. One of the culverts through which the Oxford-street main was carried (a "collar" or junction between two pipes being in the interior, section A,) was found to contain a quantity of excessively foul sewage deposit, a slaughter-house apparently, amongst other places, draining into it. It may be said that, as one result of the careless laying of the main, the latter was at different points, from time to time, bathed in refuse matters, and habitually, at certain points, in sewage-contaminated air. . . . . I had myself opportunities of observing how considerable was the suction of air into the pipes at certain points after intermission of supply, and, on its renewal, how much air, coming with much noise and force, had to be expelled. No special valves being provided for the purpose, this air must have entered by accidental openings. In May, 1887, the usual summer intermission of supply at night was commenced, and on July 7, owing to scarcity of water, the service was restricted to eight hours daily. For the same reason the pipes at this time received no proper flushing, and the evidence of the

consumers leaves no doubt that they became very foul. . . . . At any time of intermission it is plain that the leaky water-pipes were at liberty to discharge their contents through any opening at a lower level, and that they would convey, not only such water as remained in them, but those matters also which entered at the points of leakage; in short, the leaky pipes would act as so many means of draining the ground in which they were placed. Passing through or alongside old rubble culverts, they would take up foul air and liquid from these culverts and from the soil around, and would deliver these matters at lower levels (if not during intermission, on the first renewal of supply) for consumption as 'drinking water.' . . . . Chemical analysis of the water, and still more microscopical examination, afford important confirmatory results. Dr. Dupré, to whom samples were sent for analysis, reports that water taken from a house-tap in Henry-street, *before the nightly intermission of service*, was pure; while that from the same tap after intermission gives evidence of animal contamination and of the appearance of low forms of life."

No facts could more strongly emphasise the necessity for scrupulous care in the laying of water service pipes. Here it is shown that the area of disease was almost precisely conterminous with the area of water supply furnished under the conditions so graphically described in the report; and this first necessary of life, instead of the water of Life, became the water of Death.

Among the other reports to the Local Government Board on the sanitary condition of provincial towns and districts, we have Dr. Page's report on the adjoining Urban Sanitary Districts of Clee-with-Weelsby and Great Grimsby, with reference to the prevalence of enteric fever. Here the drainage seems to have been the source of evil. In Clee-with-Weelsby, we read:—

"In some houses with in-door sinks, the pipe was found to communicate directly with the drains, and the small belltrap was found displaced, allowing, as experiments showed, steady indraught of foul air into the dwelling. The yard sinks are, almost without exception, of faulty construction, and consist of a large catchpit, locally and appropriately termed a cesspool, constructed commonly of brick, and trapped either by a vertical flagstone or loose iron trap. In the latter instance there is nothing to prevent the escape of sewer air into the yard, and this, in effect, was found taking place, as might be expected under such conditions. These catchpits hold several gallons of slop-water and more or less of solid matters, and are emptied at the instance of the Authority, who contract with a person to effect this emptying at intervals of three months. Water-closet soil-pipes are inadequately ventilated by 2½-in. pipes, instead of being carried up in full diameter as required by the bye-laws; and similarly the proper ventilation of house-drains, although provided for by the bye-laws, is in no instance carried out, rain-water pipes being in general use for this purpose. So that, in effect, it may be said that under existing circumstances of sewer ventilation throughout the district the only ready means of exit for sewer air has been on and about house premises."

When we come to Great Grimsby things are no better:—

"The sewers are without adequate means of ventilation or provision for flushing, although both outfalls are blocked at every tide for some five or six hours, or even longer. During this interval the sewage is stagnant in the sewers, and the chief available means of escape for the foul air is by rain-water pipes and the defective traps of sinks and catchpits on house premises over the town."

So we go on with the same story, with variations, in one report after another. We next take up Dr. Parsons's report on an outbreak of enteric fever in the borough of Buckingham—"Old cottages, badly built, ill-ventilated and dilapidated"; "no bye-laws for the regulation of new buildings," &c.

"The sewage of Buckingham is drained into the Ouse, and, owing to the way in which the river encircles the town, so that no part is very far distant from it, the outfalls are numerous, and the individual sewers are for the most part not of very great length. The course and construction of the sewers are imperfectly known, as they have been constructed at various periods, and no plans of them have been kept; but enough is known to show that they are very defective. Those constructed in the last ten or twelve years are of socket-pipes, but some of the older ones are brick culverts, or square stone drains with bare earth bottom and irregular fall. There are catchpits in their course 3 ft. deep below the invert of the sewer to retain the grosser sediment. Private cesspools, with or without overflow into the sewers, also exist in the town. The sewers have no means of ventilation other than such inlets as may have been left untrapped, and which are often too near houses. Nor have they any regular means of flushing, the only means being to pump water into them from the river with a fire-engine. It is said that when this was recently done none of the main sewers were found blocked, though some contained 4 or 5 in. of sediment, but many of the house-drains were quite blocked up."

Water-closets have been partially introduced; hopper-closets flushed by hand from buckets; often (can we be surprised?) in "a very unsatisfactory condition." The water supply is mostly derived from pumps and wells, but as the town is nearly cut off by the river valley from any large extra-urban gathering ground, the water which the wells yield must be largely derived from the rain which has fallen upon the area of the town, and which would carry with it impurities from the surface, and from leaky drains, cesspools, &c.; little care is taken to make the wells watertight, and how porous the soil is may be inferred from the following delightful extract:—

"At a house in the centre of the town, the water-closet drains into a cesspool, the overflow of which goes into a second cesspool. The first cesspool is emptied every year, but the occupier of the house told me that the second cesspool had not required emptying during the twenty-five years that he had resided there."

There is a kind of grim humour about this statement as to the soil from which much of the drinking-water of the neighbourhood is drawn. Then we have Dr. Parsons's report on the high rate of mortality in Dolgelly, in which there is some variation from the usual type of complaint. Here it is indicated that houses are so flimsily built as to be hardly weatherproof: roofs unceiled; "hence the bedrooms must be as cold in winter as they were hot and close at the time of my visit" (report dated July 7). The following is a description of a bit of Dolgelly property:—

"*Chapel Buildings.*—An old chapel has been converted into eight dwelling-houses, of which six are entered from an open vestibule on the ground-floor, and two upstairs. One or two of the rooms are without light or ventilation, but most of the houses would have fair through ventilation were it not that the windows at the back of the block look out on to a tanyard, and have frequently to be kept closed to prevent the bad smells therefrom from entering the house. The water-closets are under the staircase in the vestibule, and are without light or air; there are two seats, not partitioned off one from the other, but one only is in use; of the other the pan has been broken away, but the water-service remains, *and is used to fill vessels at*, the water-supply to the tap having been cut off. In this block of property, including a front row, the density of population is at the rate of about 425 per acre."

By-laws have been made, founded on those of the Local Government Board, "but they are entirely disregarded"; plans of new buildings are submitted, as a matter of form, to the local authority, but no one takes the responsibility of seeing that the provisions nominally made are complied with; and it is Dr. Parsons's statement that they are an absolute dead-letter. This non-enforcement of the law he believes to be due to the disinclination, often found in small places, to appear disobliging to a neighbour, "especially one who may have influential friends on the Board." The remedy for this is to give more power and independence to the Medical Officer of Health, as has been repeatedly urged both by ourselves and by correspondents in our columns.

The Report made by Messrs. D. Cubitt Nicholls and Shirley F. Murphy to the Home Secretary on the immediate sanitary requirements of the parish of St. Matthew, Bethnal-green (dated March 17), is of a rather different order, and dwells more on the evil consequences of neglect and dilapidation in buildings. "The condition which above all others characterises dwelling-houses in Bethnal-green is the dilapidated state in which they are allowed to remain. In street after street houses defective in this respect were abundantly found in the course of our inspection. Such houses showed badly-paved yards, defective roofs, broken floors, dirty walls and ceilings, broken plaster, dilapidated window-frames, together with faulty gutters and defective pointing of walls, giving facilities for damp to enter." Newly-erected houses are free from the faults of many of those which preceded them; but the authors note serious objections to two new blocks of "Model" lodging-houses:—"In one [Queen's-buildings] the water-closets were placed in the sculleries, without direct light or ventilation; in the other [Quinn's-square], from the great height of the buildings abutting on narrow courts, the lower rooms were so deficient in light as to detract from their healthiness." This latter mistake is one which applies to a great deal of building in the West of London, as well as to many of the "Model" blocks of workmen's homes in the East. It is odd that the very authorities who object to overcrowding on a horizontal area cannot see that overcrowding vertically comes in the end to the same thing, and that the provision for a width of street which is adequate for houses 30 ft. high cannot be adequate for houses 60 ft. or 80 ft. high. Unless those who are responsible for the erection of these lofty buildings on too confined a site bring their common-sense to bear on the matter, they will, before long, be taught by the death-rate, that stern monitor in regard to mistakes in building.

We have but touched on a few of the points in these mostly able and interesting reports; enough to show that they form a class of literature deserving of public attention, and proving, in spite of the unquestionable and remarkable progress made in the last quarter of a century, how much still remains to be accomplished in improving the sanitary conditions of life in towns and urban districts.

NOTES.

THE new Court Theatre, which has been opened this week, is, in its plan and arrangement, to a great extent a repetition of Terry's Theatre, by the same architect, though the exterior architectural treatment is of a different type. The same system of fire-proof construction in the auditorium has been carried out, as well as the provision of a large number of extra exit-stairs with doors opening on a push from the inside; in this case the push is taken by horizontal brass rails standing out from the surface of the door, so that any crowding against the door must necessarily operate on the opening-gear. The stairs, both the ordinary ones and extra exit stairs, are spacious in comparison with the numbers to be accommodated in the house, and probably as well arranged as they can be within the narrow limits of the site, which, of course, impose considerable difficulty on the architect. The pit entrance stair is not a very good one, having two turns at right angles and a rather long and steep flight downwards between the turns. There was a disagreeable crush here on the opening night, we believe, the people having been admitted to the bottom of the stair before the doors were opened; means have been taken now of controlling them better by a strong barrier at the top of the stairs; but this part of the entrance arrangement cannot be considered quite satisfactory, nor do we see the necessity or advantage, as this is not a sloping site, of taking the level of the pit and stalls so far below the ground: it has the effect of lessening the climb to the gallery and upper boxes, and the distance of the exit from there in case of alarm, no doubt; but we are not much in favour of putting a theatre down into a hole in the ground, where no special features of the site render it unavoidable. The stage is cut off from the auditorium by an asbestos curtain, in this case double, with a space between; and the curtain can, in the event of sudden danger, be dropped instantaneously, though provided with a break for ordinary lowering. Sprinklers are in use on the stage, *not* automatic, but placed where they can all be operated in a moment; and we have much more faith in hand-gear for this purpose than in automatic gear, which we should expect to find fail just when it was wanted. In its practical planning and construction this is an admirable theatre of its size, and Mr. Emden may be congratulated on having achieved a distinct step in theatre-building,—

the result of having given his mind to satisfying a special requirement of the day. For the architectural characteristics of the house we fear much cannot be said. The decoration is not better than theatre decoration usually is; and the large vases, and the *fronton* (we borrow a French word for what we have no precise English one for), with nothing behind it, which forms the centre feature of the sky-line of the façade, belong to the most commonplace order of architectural accessories. The worst point architecturally is the manner in which the drum of the octagonal dome over the centre part of the auditorium hangs in the air in front of the gallery; nothing could look more unarchitectural and un-constructive; and in his next theatre Mr. Emden should endeavour to improve upon this method of designing the interior.*

A CORRESPONDENT of the *Times* draws attention to a significant extract from the *Ormskirk Parish Church Magazine*, as follows:—

"The parishioners will be glad to know the destination of the old oak benches. They are being sent to a school of art in Boston, U.S.A. A gentleman has bought them for the purpose, and the vicar and wardens have received the sum of 80*l.* for them, which amount is lodged in the bank to the credit of the Restoration Fund. We retain a few of the old seats in the church."

The idea that the benches that were taken out of an English parish church, as not good enough for the restored edifice, should be purchased by a School of Art in the new world, has an amusing irony about it; but the present taste of the Americans for relics of Queen Anne and Georgian work is, after all, a good deal of the nature of a fashion, which will probably have its day and pass away. It is natural that it should be much developed in and around Boston, where there is a good deal of what is practically actual English work of the period in existence. However some persons may regret this destination of the discarded woodwork in our restored churches, there is something to be thankful for in the above announcement, if we compare it with the following, which is from an old number of the *Ecclesiologist*:—

"The following scandalous advertisement has been sent us from a provincial paper:—'Worksop Church.—To Builders, Masons, Collectors of old carved oak, and others.—To be sold by auction, by Mr. R. A. Penson, opposite the parish church of Worksop, in the County of Nottingham, on Thursday, September 2nd, 1847, a quantity of very valuable old oak timber in beams, rafters, planks, and useful scantlings, together with the stall-ends, panels, and beautiful antique carved work. The whole of which have been removed from the interior of Worksop Church during the restoration of that ancient edifice, and will be offered in suitable lots for the convenience of purchasers.'"

It would seem that, in spite of the outcries of the antiquaries, we have really made some progress in respect for old work during the last forty years.

IT will probably not be till after the lapse of many years that the "Corpus" of Greek grave-reliefs, projected by the Vienna Academy, will be complete. Meanwhile, from time to time, monographs appear on special points under discussion, and these monographs are based on the material already accumulated for the Corpus. Dr. Alfred Brückner, in his "Von den Griechischen Grab-reliefs" raises anew a question which we noted in detail some time past in connexion with Dr. Furtwängler's introductory essay to the Sabouroff collection,—*i.e.*, whether the scenes on Greek grave-reliefs, where two figures join hands represent a parting before death, or a meeting after death? Dr. Furtwängler, with much ingenuity and learning, maintained the meeting theory, Dr. Brückner that of parting. He certainly brings a great deal of cogent evidence, and much that is new since Dr. Furtwängler wrote. Specially he brings forward instances of grave lekythoi, in which in two vases the same people appear in the one case as living subordinate spectators, in the second, as dead and principal actors. He also notes and publishes for the first time an interesting relief from a private collection in the Peiræus in which a boy and girl hold hands in the familiar "farewell" scheme. We believe it is the only instance in which children are so represented. Over the head of the boy, in whose memory the relief is made, is his name. Over the girl's head there is nothing. A frequent theory in instances of this sort is that the second unsigned figure is there "by anticipation." In the case of a child this theory is inadmissible, as no parents would be likely to make so gloomy and ill-omened a forecast. Dr. Brückner's pamphlet is a reprint from the "Transactions of the Academy of Sciences." Vol. 116., 1888.

A RATHER odd species of sculptural decoration seems in process of being added to the attractions of Cardiff Castle. On a boundary wall which has been erected in front of one of the approaches to the Castle certain spaces are to be decorated with carvings of animals by Mr. Nicholls, two of which have already been fixed, a seal, and a baboon, the seal with its head and shoulders rising over the coping. Other forms of animal life are to follow. This idea in itself is quite in keeping with the spirit in which Burges carried out the new buildings at Cardiff. What we do not like is to hear that the figures are painted in natural colours. If so (and we so understand the description given in the *Western Mail*) this is a great mistake in regard to artistic feeling and effect, and would reduce the thing to a piece of rather childish realism, quite out of keeping with the true spirit of architectural decoration.

MR. THOS. P. WORTHINGTON, of Blackpool, submits to our notice a proposal to ventilate sewers by gas-burners along the edge of the footways of streets, supported on standards, to the foot of which pipes would be laid from the sewer, and the sewer-air would be conducted to the gas-burners at about the height of ordinary street-lamps. In the sheet of drawings accompanying the prospectus of the invention a view of a street is given, from which it would appear that the distance apart of these ventilators would be about the same as that of the street-lamps; indeed, it would almost seem that the ordinary street-lamps are intended to be used for the purpose, although that is not specifically stated. The sewer-air, then, being conducted through these standards, is proposed to be "cremated" by the gas-flame; but, on its way, it is to pass through a chamber containing pans holding disinfectants. In this proposal everything depends upon the efficiency of the means of disinfection in the chambers, and in its proper maintenance at all times; and it may reasonably be inferred that sanitary authorities would find the renewal of the disinfectants from time to time, and sufficiently often, a little burdensome, and the whole arrangement might be thrown out of order on that account. As to the air being "cremated" by some of it coming in contact with a gas-flame, the expectation is unreasonable.

THE North-Eastern Sanitary Association, which has its headquarters at Newcastle-on-Tyne, with branches at Sunderland, Durham, Stockton, and Middlesbrough, has recently issued a report, chemical and bacteriological, on the air of twenty-six buildings in Newcastle, prepared for it by Professor Bedson, of the Durham College of Science, Newcastle; Mr. Lovibond, F.I.C., F.C.S.; and Mr. Severn, of the Normal School of Science, Newcastle. As an instance of how to do a thing when you have a mind to do it, this call for a report by a Sanitary Association is worthy of note. Sanitary Associations do not sufficiently declare the principles upon which their practice is based.

WE hear of a scheme for a high-level bridge over the North Sea Canal at Amsterdam which has the merit of novelty. The proposition is to erect two lofty towers supporting a high-level bridge, and with a spiral roadway round each, up which carts and carriages can pass and cross the high-level road at the top. The scheme does not sound very practical. To get headway for the several tiers of road, along with a conveniently practicable gradient, would require towers of rather portentous scale. They would afford, however, considerable opportunities for architectural effect, if properly treated.

A CORRESPONDENT writes:—"One of the first acts of the Metropolitan Board of Works, after the Victoria Park at Hackney has passed into its control, has been to remove the podium of the handsome drinking fountain, erected in 1862 at great cost, at the expense of Miss (now the Baroness) Burdett Coutts from the design of Mr. Darbishire, architect. The building being octagonal on plan, eight flights of steps, one on each face, were recessed into the podium. It is now intended to continue the steps uninterruptedly all round. It would be interesting to know whether the consent of the munificent donor has been obtained before making this considerable alteration, and whether the architect has been consulted." An engraving of the fountain will be found in the *Builder* for May 11, 1861, with a plan and section. It will be seen that in the original design the large mass of the podium between each flight of steps was an important feature in the proportion of the whole. The ornamental vases which occupied each projection of the podium are not, we must confess, a form of architectural decoration of which we are much enamoured, unless they were put to a legitimate use to contain flowers or shrubs; and we do not know that in itself a continuous flight of steps is not a better idea. But the mere continuation of the existing section of the steps would probably be unsatisfactory, as it would not give an adequate base to the structure; it would require more spread of the steps and a wider platform at the top to compensate for the loss of the projecting podium at the angles, and to avoid injury to the balance of the design. This is an important point, and we join with our correspondent in the query as to whether the architect has been consulted; he ought to have been.

IN reference to our remarks about the insanitary structure of many of the houses in the Isle of Man, the *Isle of Man Examiner* prints a letter containing a statement from a local medical man, that to the best of his knowledge there has not been a case of "diptheria" (*sic*) in Port St. Mary for many years. We believe the fact is that the case we referred to was parochially just outside the Port St. Mary boundary, so that it is only an error in form; but the important point of our comment was that if there were such cases, it was not to be wondered at, considering the insanitary condition or planning of many of the houses in the neighbourhood.

University College.—The classes of architecture, construction, and practice are about to be resumed, and Professor Roger Smith announces as the subject of the free public lecture with which he habitually begins the session, "Mistakes in Architecture." He proposes to notice both students' mistakes and architects' mistakes. This lecture will be given on Thursday evening, the 4th October, at 7.30 p.m. at the College.

Competition: Infant School, Ardwick.—In a limited competition, the design by Messrs. Smith, Woodhouse, & Willoughby, of Manchester, for the Lyon-street Infant School, Ardwick, was accepted. The building will be erected for the Manchester School Board.

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* We may add that Messrs. Holliday & Greenwood were the contractors; the carton-pierre decoration of the interior has been executed by Messrs. Heighway, Kusel, & Depree, as has also the mosaic work. Messrs. Wilkes have done the Eureka concrete staircases; Messrs. Sharp & Kent, the electric lighting; Messrs. Vaughan & Brown, the stage gas-lighting; Messrs. Starkie, Gardner, & Co., the gas and electric fittings; Messrs. Lazarus, the seats. Mr. Geo. Harrison, C.E., has acted as engineer for the fire appliances, which have been carried out by Messrs. Harker & Co. Mr. Hurrell was the general foreman of the works; and Mr. S. H. Egan has acted as clerk of works.

THE INTERNATIONAL GEOLOGICAL CONGRESS.

THE fourth triennial meeting of the International Geological Congress was held last week at the London University, Burlington-gardens, when a large number of geologists from all parts of the world assembled to discuss various problems of international importance to their science. The first meeting of the Congress was held in 1878 in Paris; the second in 1881 at Bologna; and the third in 1885 at Berlin. All the meetings have been successful, but the present one has drawn together a very much larger number, especially of the more influential geologists, than any of its predecessors. The Congress is international not only in name but in nature, delegates from nearly every civilised country in the world having attended. It is of great importance to geologists, as to all other scientists, to have uniformity in nomenclature, and the present Congress has been largely occupied in fixing boundary lines and terminology. How far it has succeeded we hope to show in the sequel.

The first meeting was held on Monday evening, the 17th, when the President, Professor J. Prestwich, M.A., F.R.S., read the opening address, which, like nearly all the speeches and publications of the Congress, was in the French language. It consisted of a tolerably comprehensive *résumé* of the results of the previous Congresses, and also indicated the lines upon which the work of the week would be conducted. He said that at the Paris Congress it was suggested that the three (so-called) primary colours—red, blue, and yellow—should be universally adopted in colouring geological maps, as representing the three great rock groups—Primary, Secondary, and Tertiary; various tints of the colours, and *hachures*, being employed to indicate the divisions and sub-divisions of these groups. It was subsequently found, however, that these elementary colours were quite inadequate to graphically express the different formations; in fact, it was far too narrow a scale, so that at Bologna and Berlin various modifications were made by the introduction of complementary colours. Referring to the unification of nomenclature in regard to the great divisions of the earth's crust, it had been felt that it was essential to have an agreement on the terms used, and it was recognised that a dictionary of geology comprising the etymology or place of origin of every geological name, its synonym in other languages, a definition in French, and an illustrative diagram would be very useful. It had been resolved to publish an international geological map of Europe on the scale of $\frac{1}{1500000}$, which map was now in course of execution at Berlin. A preliminary general agreement had also been arrived at by the different countries appointed to inquire into the unification of geological terms, by which the term "group" should be applied to the three great stratigraphical divisions, thus—"Primary group"; "system" for sub-divisions of these, such as "Silurian system"; whilst the words "series," "stage," and "assize" were to be used in further sub-dividing. In like manner, in regard to divisions of geological time, the terms "era," "period," "epoch," and "age" would be recognised; thus "Primary era," "Silurian period," &c.

Amongst the questions for discussion at the present Congress, he said, would be the classification of the Cambrian and Silurian systems; the relations between the Carboniferous and the Permian, the Rhætic and Jurassic, and between the Tertiary and Quaternary. He concluded the address by alluding to the new questions to be raised respecting the crystalline schists.

On Tuesday, the 18th, Signor Capellini, Rector of Bologna University, occupied the chair, when the classification of the Cambrian and Silurian rocks was discussed. The principal point at issue was whether it is advisable to divide these rocks into two great series, the Silurian and Cambrian; or into three by the introduction of the Ordovician between these two. The boundary line between the Cambrian and Silurian has always been the subject of dispute, the geologists of one school adding part of what others consider Silurian, to the Cambrian, and *vice versâ*. The term Ordovician was proposed to embrace all the beds in dispute, and so to end the controversy; moreover, there are palæontological grounds warranting the division of the group into three parts, as all admit. The subject was very warmly discussed by the specialists of this branch, and the chairman, in bringing the proceedings to a close, observed that in default of a unanimous decision the vote had better be postponed. Amongst the speakers were Mr. C. D. Walcott (Washington), Dr. Sterry Hunt (Montreal), Professors Otto Torell (Stockholm), Gosselet (Lille), Dewalque (Liége), and Kayser (Marburg); MM. de Lapparent (Paris), Delgado (Lisbon), Barrois (Lille), and Drs. Hicks, Geikie, &c.

Wednesday's meeting was occupied by the consideration of "crystalline schists." A series of memoirs had been printed and distributed amongst the members at the opening of the Congress, and, these being taken as read, discussion at once proceeded. The memoirs and debates were of a very technical nature, the origin of the schists being the primary object to be attained by the discussion. The whole subject is involved in much obscurity, but the brilliant discoveries recently made,—especially in this country,—have materially assisted in clearing up many of the difficulties which lay in the way. At the present time there is no branch of geology occupying so much attention as these metamorphic rocks, but we think that it is premature to make any attempt at generalisation. We must be content to wait until more facts are accumulated in the field and by the microscope. We were not at all surprised, therefore, to hear so many diverse opinions on the subject at the meeting. The views expressed by the majority of the speakers were those which have already found vent in their various publications. Professor Lory (Grenoble), MM. Mattirolo (Turin), Macfarland (Ottawa), Issel (Genoa), Heim (Zurich), McPherson (Madrid) and others joined in the debate.

At the fourth sitting, on Thursday, the work for the meeting was the consideration of the limits of the Tertiary and Quaternary rocks. The discussion, however, turned on the question as to whether it is advisable to retain the term "Quaternary" in the classification at all. The general public are, perhaps, more interested in this day's proceedings than in those of any of the other days. The great thicknesses of sedimentary rocks, about twenty-five miles, composing the earth's crust, are divided into three parts, each of which is identified by special features of palæontological importance. Thus the Primary group is remarkable for the abundance, first of invertebrates, and then of fishes; the Secondary for reptiles; whilst the Tertiary claims the existing genera and species of mammals as its own. At the top of the Tertiary some deposits, a few hundred feet thick at most, contain records of the existence of man, associated with skeletons of the mammoth, rhinoceros, &c. Many years ago it was proposed to institute a fourth term, Quaternary, out of these superficial deposits. According to this mode of classification, the line at the top of the Tertiary would be drawn at the base of the Quaternary, the sedimentary rocks thus being divided into four parts. It is obvious, however, that it is impossible for many geologists to attach the same importance to the few hundreds of feet of strata comprised within the Quaternary beds as to the many miles in thickness of the Primary. It is admitted on all sides that the superficial deposits are important enough to be separated from those below, but only as a minor sub-division of the Tertiary, and not as a distinct geological group. It is not accompanied by any special biological change in the character of the fossils, as are the great groups referred to, the only circumstance of note being the appearance of man during their deposition. This fact, however, has called into existence an enormous literature, so great indeed as to be larger than that relating to the whole of the rocks beneath. In this way the importance of the deposits has become much exaggerated, and it, therefore, seemed fitting for the Congress to discuss the relative value of the beds in the general classification of rocks. The result of the discussion showed that they could not arrive at a satisfactory agreement on the conditions necessary to form a distinct group. Before any further progress can be made in classifying rocks, it seems necessary, therefore, to state precisely the nature of the essential characters which are to distinguish groups from the minor divisions. The same remarks apply to the different sub-divisions. MM. Renevier (Lausanne), De Lapparent and Gaudry (Paris), Sacco (Turin), Pilar (Agram), and Drs. John Evans, Blanford, and Professor Prestwich, joined in the debate.

At the fifth sitting, on Friday, M. Hauchecorne (Berlin) submitted the first proof of a section of the geological map of Europe referred to in the President's opening address; after which the discussion on "crystalline schists" was resumed. The proceedings were of a very technical nature, and precisely similar to those on the previous Wednesday, so we need make no further comment.

At the final sitting, on Saturday last, arrangements were made respecting the next meeting of the Congress at Philadelphia in 1891; whilst the report of the committee on the subject of voting at the Congresses was submitted. There has always been a difficulty in adjusting the votes, by reason of the fact that the countries in which the Congresses have respectively been held have naturally had a very much larger body of members present than countries at a distance, and this rule is always likely to obtain. Thus, at the present Congress, English geologists far outnumbered those of all the other countries put together, so that the English could carry any proposition they chose to bring forward, if their votes had the same value as those of the foreigners. To adjust matters, the committee came to the conclusion that the votes of native and foreign members should be taken separately. If the votes of the two divisions were accordant the result was to be accepted, but if they differed, the subject was to be considered immature for settlement. Theoretical matters were not to be voted on at all. Professor Prestwich then gave his concluding address, which was an epitome of the results achieved by the week's meetings; and, after the usual votes of thanks to various officials, the meeting in London terminated. In reality, however, the session is not concluded until to-day (Saturday). On Monday last, official geological excursions, to last during this week, were made by members to the Isle of Wight, North Wales, and Yorkshire, under the best available guidance.

Now that the general meetings are over, let us examine the results arrived at. In the first place we may state our conviction that so far as the actual meetings of the Congress are concerned they have done but very little towards advancing the science. One of the most important objects of the Congress, it is true, has been brought to a conclusion,—the unification of colours and shadings in maps. But this, however useful it may be in rendering the coloured maps in the proceedings of societies and the like uniform, will have no practical effect, we are afraid, on official maps. Most of the countries of Europe, for example, have official geological surveys which for some time past have been issuing coloured maps each on their own plan, adopting various methods of colouring. But few of these surveys have completed their maps, and very many years must elapse ere some of them will be able to do so. It is not possible that the future maps of these surveys will be coloured differently from their predecessors, for the series would not then be uniform. Again, referring to our own country, the maps which form the fundamental work of British geologists are those issued by the Geological Survey. The series is nearly complete, and we may be quite certain that the Government will not cause the whole of them to be re-issued according to the new colouring and nomenclature, on the ground of expense.

In regard to the other work of the Congress, we believe it will be useful in a certain sense, but we do not think that the most was made of the time at the disposal of the session. For example, if the Committee had resolved on the method of voting at the opening meeting instead of at the conclusion of the week's work, something like decided results might have been obtained. We fully appreciate the difficulties lying in the way of coming to a unanimous conclusion whilst the members of the Committee were separated from each other, but surely something might have been arranged so that the first meeting should have decided this all-important question.

Again, it may well be questioned whether the general methods of procedure were the best that could have been adopted for such a mixed assemblage of specialists. Geology has now grown to such an enormous science, that to make any real advancement there must be special departments, and, consequently, specialists. The technical questions brought forward at the meetings could not possibly be successfully debated by any save the specialists in the branches concerned. The result of this was that the vast majority of geologists present were wasting valuable time in listening to questions foreign to their particular departments. For instance, the debate on crystalline schists had comparatively little interest to those geologists who study, say, the Tertiary beds only.

Turning to another aspect of the science, it seemed a great pity that questions of practical value were not even alluded to. Amongst the geologists present we noticed some of the greatest authorities in Europe on the geological aspects of water-supply, mining, building-stones, road-metal, &c. It seemed a very fitting occasion to debate questions relating to the application of geology to various practical purposes, for we doubt whether so many eminent authorities on these subjects were ever before gathered together. The science would become much more popular if its applications to every-day work were better understood. We would not wish the *savants* to discuss anything foreign to the science, but simply to take the purely geological sides of the questions. Many of these latter are in no wise inferior to any of the greatest problems of the science in point of philosophic interest, whilst they are infinitely more useful to mankind. One has only to study the geological aspects of water-supply, for example, to become convinced of our ignorance on many points relating to the behaviour of water underground. We have occasion to know that some of these authorities at the Congress hold different views to the majority of English geologists on these and cognate subjects, but no provision was made to enable them to ventilate their opinions. The palæontological side of the science also was almost entirely neglected.

Now, we do not suppose for a single moment that the limited time at the disposal of the Congress would have enabled the members to discuss in detail the questions relating to every department,—it would be absurd to suggest such a thing. What we do say is, that the whole of the members of the Congress should only have been present at those discussions which affect every department of the science alike, whilst at other times provision might have been made for specialists to hold meetings for debating points peculiar to their respective branches. In other words, under such circumstances, the Congress should be divided into sections. We should then have obtained the greatest possible amount of work in the available time. The voting, also, could not fail to be more telling, for what is the utility of the whole of the members voting on questions of which many of them can have no special knowledge? Those only who have a right to an opinion on the particular subject under consideration should be entitled to vote.

Another thing we must take exception to, is the short time allowed for each meeting. The Congress met in the mornings only. It is true that whilst sitting they worked very hard, but then nearly double the work could have been accomplished if the hours had been extended. Instead of that, however, excursions to various places were arranged for the afternoons. Not that these were uninteresting, but it did not seem to be making good use of the time. The places visited were Kew Gardens, British Museum, South Kensington Museum, Eton, Windsor, Erith, and Crayford. In the evenings receptions were held—on Monday at the London University, by Professor and Mrs. Prestwich; on Wednesday, at the Jermyn-street Museum, by the Director-General of our Geological Survey, Dr. A. Geikie; and on Friday at Burlington House, by the President of the Geological Society (Dr. Blanford) and Mrs. Blanford. Each of these was numerously attended. The large library of the London University was turned into a temporary museum, in which was exhibited a large and valuable collection of rocks, fossils, maps, &c., mainly illustrative of the questions discussed at the Congress.

It must not be supposed, however, that the London meeting has done no good. On the contrary, the congregation of specialists has furnished the opportunity for many quiet chats and conferences, apart from the general meetings, and we feel sure that these have done more real good than have the formal gatherings. The evening receptions have, in this manner, been of the greatest use, as was apparent to even the most casual observer. The men who composed the Congress were those who have practically made the science what it is; they are all earnest devotees, and did not come here to idle their time away. Many groups were to be seen earnestly debating knotty points, the results of which will, no doubt, sooner or later be published in the memoirs written in their native lands.

The adoption of the French language has greatly facilitated these discussions, whilst the publications in advance enabled one to reflect on the different problems to be presented, without fear of misapprehension. The publication of the nomenclature Committees of the different nations cannot fail to have an enormous influence in bringing about the unification of terms, and, even if the Congress had succeeded in doing nothing else, the work in this direction has produced a lasting impression of immense importance, not only to the exclusive students of the science, but to civil engineers, miners, and others whose daily avocations lead them to make practical use of the science.

THE BASTILLE AND THE TOWER.

A PARALLEL.

WE have adverted from time to time in our "Letters from Paris"* to the restoration carried out by M. Colibert (a pupil, by-the-bye, of Viollet-le-Duc), and M. Ferruson, of the Bastille and the old Rue St. Antoine, on the Champ de Mars.

The Bastille may be regarded as the Tower rather than the Newgate of Paris; the latter prison, indeed, had for its closer counterpart, in Paris, the Conciergerie of the Palais de Justice. As touching both its origin and position, together with the uses it was made to serve, the Bastille possessed several features in common with the Tower of London. The Conqueror planted his vast *Arx Palatina* in the south-eastern angle of London, athwart the city wall, by the Postern and Iron Gate—a citadel dominant over the City, and the approach by the river Thames. The Bastille was established in the south-eastern corner of Paris, at a gate in the wall of the capital, and close by the water-side. Like, also, to the Tower, it was fortress and prison, and, though never a palace, was once used as treasure-house by the king.

The name itself of Bastide, from *bastir* or *bâtir*, since modified into Bastille, formerly denoted a work of defence, as part of a line of fortification. Bastides were of two kinds: those erected upon permanent foundations, and those of the sort so minutely described by Julius Cæsar, which were built up for occasion by an army of besiegers. Until the end of the thirteenth century, however, the style of "bastide" was more commonly applied to temporary structures for attack than to fixed forts. But gradually, as that engine of assault fell into disuse, bastide was adopted as a generic term for towers or outworks, made of masonry, and connected with a circumvallation or enceinte. The name of Bastide was given to the larger bastions of this description around the walls of fortified towns in France. Of those in the capital, the two most important were the Bastide St. Denis, and the Bastide St. Antoine — the Aldersgate and the Aldgate of Paris. The ancient Porte St. Antoine lay hard by the Arsenal on the Seine, at the point where the river entered the capital from the south-east. In King John's time, if not indeed at an earlier date, this gate in the city wall was flanked by two towers circular in plan. These answered, moreover, as a protection and guard for the arsenal. To carry out his scheme for completing the enceinte of Paris, Charles V., or the Wise, commanded Hugues Aubriot, afterwards Provost or Prefect of Paris, to strengthen the two existing bastions with the addition of six similar towers. The eight towers were connected by massive curtain walls; and the whole fortress was surrounded with a wide moat. The foss was crossed by two principal bridges to carry the road, east and west. In each tower was built a newel staircase giving access to the ramparts above.

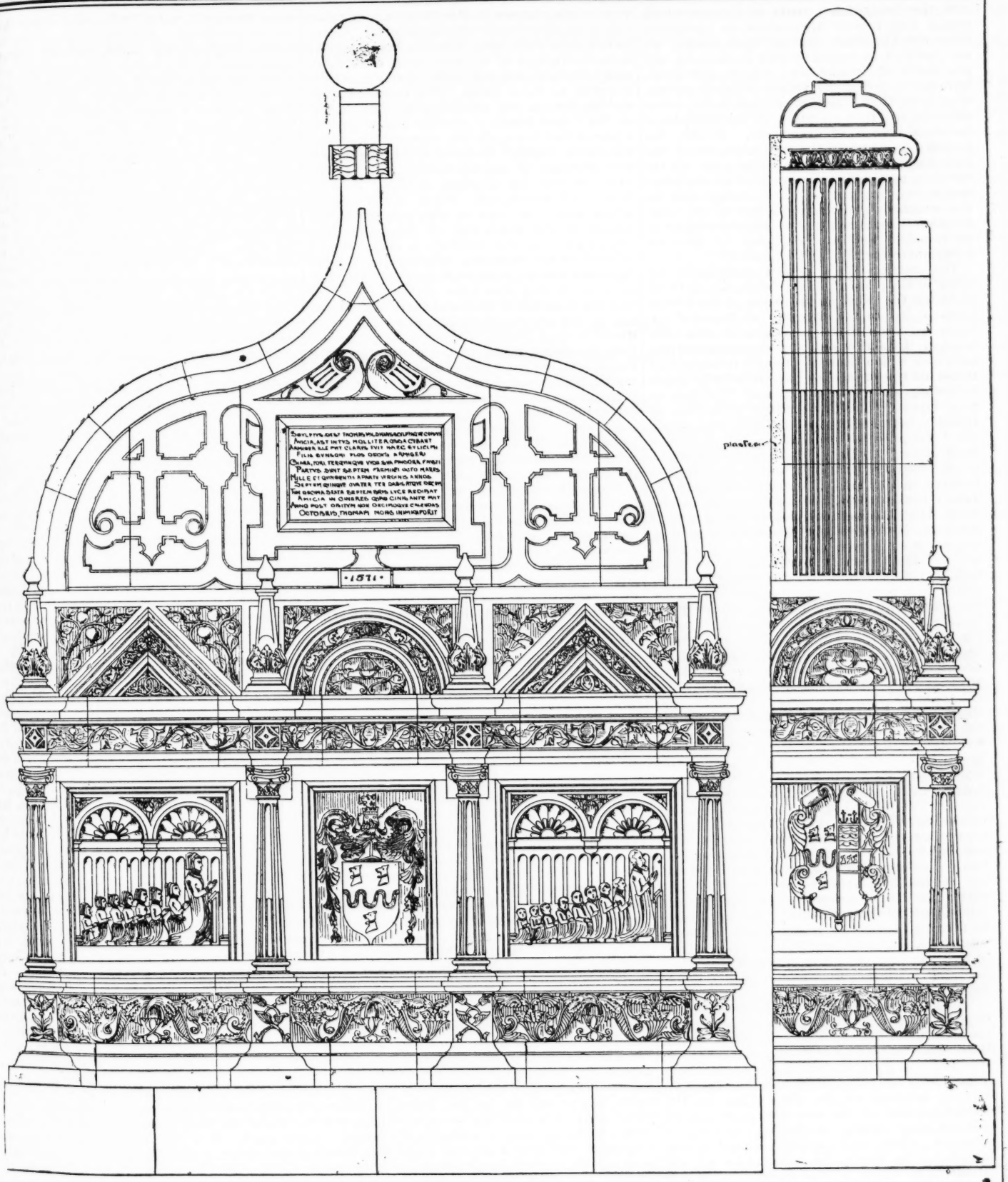
In this manner the ancient Porte St. Antoine was transformed into a notable example of military architecture as that art was then practised. The plan of the remodelled fortress—which soon became known as the Bastille, *par excellence*, of the entire line of fortifications around Paris—may be described as an oblong in shape, standing with its greater length north and south, and having the outer (eastern) concave from within, in adjustment with the alignment of the wall. In the middle of the eastern curtain was the original Porte St. Antoine, flanked by its towers; the Tour de la Chapelle (north), and the Tour du Trésor (south); corresponding to these, in the western curtain, stood the gate that opened into the town, guarded by the new Tour de la Bertandière (south), and the Tour de la Liberté (north). The remaining four towers stood out from the four salient corners, and were known as the Tour du Puits (north-east), the Tour de la Comte (south-east), the Tour de la Bazinière (south-west), and the Tour du Coin (north-west). All of the eight towers were half-engaged, of very massive proportions, and were capped with the customary conical roofs. Two minor gateways, leading to drawbridges, were pierced in the northern and southern curtains, to afford access across the moat into the town and the arsenal respectively. Within, the large central space was called La Grande Cour, north whereof lay the magazine and the Cour du Puits, and south another court, the guard-room, residences, &c. The city wall, we should add, adjoined the Bastille at the north-eastern angle, by the Well Tower, or Tour du Puits. In Viollet-le-Duc's "Dictionnaire Raisonné de l'Architecture, &c.," vol. ii., edit. Paris, B. Bance, 1859, will be found a plan of this fortress, together with a *vue cavalière* as taken from the south-west. This latter view is reproduced from the representation of the city *à vol d'oiseau*, as it was in the time of Charles IX., 1560—1574, and which Viollet-le-Duc refers to as being in the tapestry at the Hôtel de Ville.

To again illustrate our parallel between the Tower of London and the Bastille we should point out that the Bastille St. Antoine, as we have described it, was originally erected to repel assault by the enemies of England. But when, eventually, foreign foes had disappeared it became in turn the key to the possession of the capital during seasons of revolt and civil war. In the year 1420 it was taken by John, Duke of Bedford, who nominated for its captain-general that redoubtable warrior, Sir John Fastolff. Sir John, perhaps, is equally renowned for his benefactions to Magdalen College, Oxford, and to the Schools of Law and Philosophy at Cambridge. When Charles VII., or the Victorious, re-captured Paris from the English in 1436, the Bastide afforded a refuge for his adversaries. In the year 1558 the Bastide St. Antoine fell into the hands of the Duc de Guise, who gave the command of it to Bussy Leclercq, and incarcerated within its gloomy towers the Parliament for their non-adherence to the League. During the siege of Paris, 1587-1594, Henri Quatre was for a long while successfully resisted in his endeavours to secure this fortress. But on becoming master of Paris he committed the Bastide to Sully's charge and converted it into his treasure-house—just as our sovereigns formerly did with the Tower. On January 11, 1649, the Bastide capitulated to the forces of the Fronde, and by treaty the Frondeurs retained possession thereof. It was not restored to the king until October 21, 1651.

The annals of the Bastille—to use the more familiar designation—as a state prison are supposed to date from the reign of Louis XI. That monarch was wont to call the iron cages with which he furnished it his "fillettes." In one of them, by the way, was kept for eleven years their inventor, the Cardinal Ballue. That prelate is familiar to every reader of a work which to this day gives us the most masterly portrait of his Sovereign—"Quentin Durward." But it was not until Louis XIII.'s reign that the Bastille served regularly as a place of durance, when, and for ever since, its very name has been adopted as a synonym for the exertion of atrocious oppression. Yet in his recently-published book Captain Denis Bingham goes far to demonstrate that the commonly-received tale of horrors is painted in blacker colours than actual facts will warrant. Soon after the historic assault, of three hours' duration, on July 14, 1789, the Bastille was demolished. Much of the materials were utilised in constructing the Pont de la Concorde, 1790. Nevertheless, the Porte St. Antoine, as a gateway, survived for many years later. The prison site is now marked by a line of stones in the recently re-named Place de la République. Within the last fifteen years the familiar figure of Mercury has been replaced with one of the Republic on the summit of the column of July. That column, entirely of bronze, and 154 ft. high, does not commemorate the Bastille, but was erected in 1831 in memory of those "citoyens"—*i.e.*, denizens of the adjacent insurrectionary faubourg,—who fell in the "Three Days" of July in the year before.

* See the *Builder*, vol. liv., No. 2,348, p. 80; *et ante*.

Appointment.—At the monthly meeting of the Rural Sanitary Authority, of Kineton, last week, Mr. E. Willcox, engineer, Birmingham, was appointed to inquire into the question of providing a water-supply for the parish, with the view of propounding a scheme for an adequate supply.



The Mildmay Tomb in St. Mary's Church, Chelmsford.—Drawn by Mr. H. P. Burke Downing.

THE MILDMAY TOMB IN ST. MARY'S CHURCH, CHELMSFORD.

THIS tomb, which stands in the north aisle of Chelmsford Parish Church, is one of the few objects of antiquarian interest now left there, most of the ancient tombs having been no doubt destroyed by the fall of the greater part of the building in 1800, caused by the undermining of the foundations. The two large panels in the front elevation contain painted effigies of Thomas Mildmay, with his wife and fifteen children. The workmanship of this tomb, like a good deal of the work in the Eastern counties, shows a certain amount of Dutch feeling. The carving is all most carefully executed, and, with the exception of the panels containing the effigies and the family arms, is kept in very low relief. It is noticeable that the small pilasters have their abaci curved upwards. The illustration is from measured drawings by Mr. H. P. Burke Downing.

THE ARCHÆOLOGY OF TIN.

IN the recent notice on "Ancient pigs of lead," printed in the *Builder*, No. 2376, an endeavour was made to show the reader some of the many interesting facts, antiquarian, historical, and technical, which are illustrated by those remarkable objects. We may now, in like manner, turn our attention for a while to the consideration of an equally important metal, which, although represented by a far smaller series of extant antiquities, possesses aspects of history and fine art scarcely inferior to that which then formed the subject under review. Tin, too, it is found, has its earliest history buried in oblivion, for no one knows at what precise date this metal fell under the observation of man It is not unlikely that accident, to which so many discoveries both ancient and modern are due, first displayed the characteristics of tin to those who were not slow to profit by what they saw. But be this as it may, there is no doubt that the aboriginal inhabitants of the south-western parts of England were in possession of the mystery of tin-smelting long anterior to the Roman conquest. Some of the most ancient notices of our islands speak, as does the account by Polybius, for example, of the method in which the tin was obtained and prepared in the Britannic Isles, as if it was a matter of ordinary knowledge. From sources such as these, we learn that the Phœnician traders drew their supplies of this metal—an article in use as remotely as the Homeric age—from Britain. The late T. Wright, whose authority possesses great weight, considers that as this metal is found principally in Cornwall

and the Scilly Isles, parts of Britain which would first present themselves to navigators from the Phœnician port of Spain, Cadiz, we are justified in believing that these parts, and the south of Ireland, *i.e.*, Albion and Ierne, were the only districts visited by those people, who kept their knowledge profoundly secret with the manifest intention of monopolising a lucrative branch of commerce. Strabo, the geographer, narrates the vain attempts of the Romans to discover the place whence the tin was then obtained, and says that on one occasion a Phœnician captain, perceiving that he was watched by Roman vessels, ran his vessel upon some rocks rather than allow the secret to be revealed, and was rewarded by his own government for his patriotic conduct.

The mission of a Roman commander by Cæsar at the close of his first campaign in Gaul, to reduce the tribes on the shores of the British Channel, led to the discovery by Rome of the route by which the merchants of Phœnicia reached Britain by sea, and demonstrated the ease with which tin was obtained, it being then found on the surface, or at a very little depth below the surface, of the ground. Previous to this, however, the Carthaginian expedition of Himilco, between 362 and 350 B.C., had visited the "Tin Islands," near Albion, two days' sail from Ierne, by which, according to Wright, he is supposed to mean some of the isles on the Cornish coast, unless, perhaps, Guernsey or Jersey is alluded to; and another commercial state, the Phocean colonies of Massilia and Narbona, Marseilles and Narbonne, carried on the same commerce overland. At the Polytechnic Institution at Southampton, in 1864, Col. Sir Henry James brought forward reasons which have been supported by many others, for considering St. Michael's Mount, Cornwall, to be Ictis, the mart at which the ancient British tin trade was conducted. On the other hand, the late Rev. Edm. Kell, M.A., F.S.A., an industrious writer on the subjects connected with ancient British archæology, holds to the opinion that the Isle of Wight was the locality alluded to by Diodorus Siculus in the well-known passage declaring that the metal was carried from the district in which it was found to an island in front of Britain named Ictis, where it was purchased by native merchants, transported to Gaul, and carried overland for thirty days by pack-horses to the mouth of the river Rhone. Kell points out that it cannot be precisely ascertained when the tin trade of the Isle of Wight began, but conjectures the date to be between 300 and 200 B.C. Its decline he places at the time when the entire conquest of Britain by the Romans supplied more convenient marts. The arguments in favour of these two routes would be out of place here, they may be examined and weighed in Kell's account of a Roman building in Gurnard Bay, in the "Journal of the Archæological Association," vol. xxii.

We may now pass on to the investigation of some points connected with the knowledge by the ancients of the characteristics of the metal. Here, again, at first, all is obscure and confused. It is doubtful if tin was originally discriminated from pewter and some kinds of lead. Archæology is indebted to the elder Pliny for the earliest account of the uses and properties of this and other metals. As for tin, *cassiteros*, or *plumbum album*, this writer declared it was fabled to be sought for in the isles of the Atlantic, to which it was brought in wicker vessels, covered with leather, but now (that is, in his day) it is ascertained to be indigenous in Lusitania and Gallicia in sandy surface soil, to be of a black colour, and only distinguished by weight. Small pebbles of the ore also occur, he goes on to say, principally in dried beds of streams, which were washed by miners, who melted the product of their washing in furnaces. The Homeric mention of this *cassiteros*, as entering into the composition of the armour of the heroes of the poems and the chariot of Tydides, imply easy fusibility and ductility, and a high money value. Pliny's knowledge of tin in Spain is confirmed by recent mineralogical investigations, which show it occurring in beds of the mica schist of Gallicia; and in the form of oxide of tin the metal is now known to be widely distributed over the world. Dr. J. Phillips, who has investigated the ancient metallurgy of Britain, considers that Cornwall and the Asiatic Isles have been the principal, almost the only, sources of the tin of the ancient world.

Stannum, an alloy of argentine or tin-like aspect, a variable pewter, melting at a less temperature than copper, was used for lining copper vessels, the danger of using untinned copper vessels being known in Pliny's time. So-called "German silver" and "Britannia metal" belong to this class: the term *stannum* being applied to natural alloys of tin with lead, brass, antimony, or silver; but now distinctive appellations are given to these forms. The easiest way of melting the tin ore, according to Phillips, was on the "open hearth;" another use of peat as a proper fuel to supply the necessary free carbonaceous element is shown by the indispensable privilege of digging turf to melt tin, introduced into the charters of King John in 1201, and subsequent Royal confirmations, which were from time to time granted to the miners of the south-west of England. The employment of the bellows, a very ancient adjunct of the workman (depicted as it is in Egyptian tombs), completed the apparatus; and pure tin having thus been obtained, the rest was but a matter of time, and combinations and alloys, the art of soldering, and so forth, gradually became known. Curious to say, the proof that the direct union of tin and copper was carried out by the natives of Britain is wanting, although one recent writer thinks the evidence is gradually accumulating in favour of bronze-making in Celtic Britain before the Romans came, and it is thought by others that bronze passed into the ancient world of civilisation through the medium of manufactures at Cyprus for one at least of its centres.

Recent investigations on Dartmoor, which have been carefully described by Mr. R. Burnard in the "Transactions of the Plymouth Institution," indicate the disturbed state of the surfaces of the valleys, with evidence of "tin-streaming" operations, in mounds and excavations, for mile after mile; remains of rude smelting-houses, stones with curious circular cavities, and moulds for use in casting ingots, hewn in granite blocks, furnaces, ancient water-courses, and wheel-pits. During the Saxon period the production of tin, which the Romans had favourably carried out in succession to the native works, seems to have been neglected. Tin streams and mines, whether outside the scope of the Domesday Book or not, at any rate find no mention in that record, whereas lead and iron occur continually. Probably the earliest record of a stannary is that in the Pipe-roll, 8 Rich. I., A.D. 1197, wherein account of 100*l.* for the farm of that of Devonshire, and 100 marks for that of Cornwall, is rendered for the year. The visible remains of tin-streaming works on Dartmoor are at least as old as this, and probably of much more remote date. According to Dr. J. Evans, P.S.A., as cited by Mr. Burnard, the commencement of the bronze age in Britain is approximately to be reckoned from 3,000 to 4,000 years ago, and if the hardening of copper by alloy of tin was carried out—as some assert—on the spot, its production on Dartmoor is equally remote. At first, no doubt, the stores of the ore were simply gathered on the ground, as shed from the main lode; then followed trenching to the depth of 5 ft. or 6 ft. in depth, and 3 ft. or 4 ft. in breadth; finally, the true mining or excavation, and improved processes of smelting, at length brought the getting of tin down to its latest aspect. Mr. Burnard has measured and described two ruined sets of "blowing-houses" on Dartmoor, where the pit for the overshot water-wheel,—which worked the furnace bellows, and turned a crazing-mill, or worked rude stamps,—circular or oval-shaped cavities which may have been moulds, mortars, bottom-stones of primitive stamps, and other manifest relics of the tin-miners' apparatus, were found.

At Week-ford, near the junction of the Dart with the Wobrook, one of these ancient smelting houses stands in dilapidated ruin, a parallelogram 33 ft. long and 16 ft. wide with an outer enclosure. Not far off is another smaller ruin with a fireplace recess, a portion of a chimney back, and a hearthstone removed from its original position, and walls from 3 ft. to 4 ft. wide. The foundations of the waterway or "launder" conveying water to the wheel are visible. In the neighbourhood is a hut circle measured to 27 ft. in diameter, with foundations apparently Celtic, and with traces of later use, and ancient enclosures up the hill, as it were mapping out the slope in squares. Another, the "Har Tor" blowing-house, two miles to the south-west of Princetown on the head waters of the Meavy, shows two ruins, one on each side of the stream. In one, 16 ft. by 12 ft., the chimney still stands 6 ft. in height, and there are stones lying about provided by the smelters, with circular cavities of varying dimensions for receiving molten metal. In the other, 22 ft. by 16 ft., the entrance doorway 3 ft. 6 in. wide and 5 ft. high, with jamb and lintel grooved and holed for a door, wheel-pit, water outlet, and other details are yet preserved. Numerous hut circles stand on the neighbouring slopes, and the disturbed appearance of the valley indicates very active streaming operations at some far distant period. At Gobbett, near Hexworthy, are examples of three successive stages of the tin miner's art, viz., the stream works of the "old men," the deep trenches of later miners, and the modern shaft. Here, too, are found the remains of a crazing-mill, or crusher, with upper and nether stone, the latter 3 ft. 10 in. diameter and 10 in. thick, and circular eye $6\frac{1}{2}$ in. wide, and having in its periphery a groove forming a lip whereby the triturated stuff was readily discharged from the stone. The upper stone measures 3 ft., with central eye 5 in. diameter. A pointed conical plug fitting into the nether stone also fitted the upper one loosely. This enabled the broken ore to be fed into the mill, while the upper stone was rotated by means of handles or bars fitted into holes somewhat after the method of a capstan. The most interesting object here is a stone, about 4 ft. by 3 ft., bearing a mould-cavity 15 in. long, 11 in. wide at one end, 10 in. at the other, and 4 in. to 5 in. deep; near to it on the same side two small holes, considered to have been used as sampling cavities. Another stone has a cavity for molten metal 17 in. long, 10 in. wide at one end, and 15 in. at the other, with depth varying from 3 in. to 8 in. The proximity of furnace slag, flint chips, flakes, and scrapers shows that there were early men at work on the tin in this part of the moor.

Rectangular buildings, similar to the foregoing in many respects, have been observed and described in other localities of Devonshire and Cornwall, associated with hut circles and other prehistoric remains. They must either be contemporary with these remains, or evidences of a successive occupation of sites previously worked. The dimensions of the moulds or stones adjacent to these have been recorded as 17 in. long, 11 in. wide, 8 in. deep, and 15 in., 8 in., 3 in. respective sides. One mould, on a stone, is connected by a channel with another at a lower level, as though it were used for the purification of the tin, for molten metal mixed with impurities in the furnace poured in on the high-level depression, or would flow in a purer state into the lower mould. At Swincombe, in a valley once extensively streamed for tin, are the remains of one of the rectangular houses concealed in a mound; it measures 20 ft. by 13 ft., built of dry-laid stones, some roughly shaped, and having a chamber at one end which appears to have formed part of the furnace arrangement.

It now remains to describe briefly the tin ingots and other relics of this ancient tin manufacture. In the neighbourhood of Penzance, between Pendinas and St. Mawes, a mould for tin blocks appears to have existed, but its form and dimensions have escaped observation. A very remarkable specimen of double-pig was dredged up at Falmouth, about 1810, and passed into possession of the Truro Museum. The dimensions are 2 ft. 11 in. long, 3 in. thick, 11 in. wide, width between the forked opening $10\frac{1}{2}$ in., each prolongation 12 in. long. It is shuttle-shaped, or pronged (I), and has been thought by some to be in the form of an ancient letter or symbol, by others as an *astragalus*, or knuckle-bone shape. On one of the arms is the impression of a bifurcate mark. It is flat on one side and curved on the other. Sir Henry James ingeniously accounts for the adoption of this shape by claiming for it a peculiar fitness for being stowed at the bottom of a boat, and on a saddle for a beast of burden. Moulds of this character have not yet been met with. The Museum of the Plymouth Institution contains also an ancient ingot of tin with a hole for use in transport, 14 in. long, 8 in. to 7 in. wide, 52 lbs. weight. It is one of two of identical form found in digging a drain at Slade, near Cornwood. In the Truro Museum is a portion apparently of a pig or block of tin found at Carnanton, in Cornwall, near the ruins of a so-called "Jews' House," or ancient smelting-place. It is wedge-shaped, 20 in. long, 9 in. wide, 3 in. thick, tapering to a blunt point, one side convex to the form of the mould, the other flat. In the Great Exhibition at Hyde Park, in 1851, a rudely-smelted block of tin was shown by Mr. G. N. Simmons, found in Ladock, near Truro, and believed to have been manufactured when the Phœnicians traded to Cornwall for tin. It is recorded that tin was exported in long, square slabs in the fourteenth century, but no examples have come under our notice. This catalogue of ancient tin blocks is not extensive, but enough have been recorded to illustrate the special aspects of the archæology of this metal.

THE INSPECTION OF PIPE SEWERS.

IN the *Builder* of Sept. 4, 1886, there is an account of the progress of the City of Buenos Ayres Improvement Works, and it is therein stated that there are about 116 miles of conduits and sewers in the city portion or first section of the drainage and sewerage works. These include about eighty miles of stoneware socket-pipes of 12 in., 15 in., and 18 in. diameter. They are laid in straight lines, and the distance between the manholes is about 140 yds., equal to the length of a side of one of the squares into which the city is divided. One manhole forms a junction-chamber for one or more sewers.

In the construction of the pipe sewers the chief difficulty encountered by the engineers was the want of experience on the part of native contractors; they did not always understand the necessity for great care in laying the pipes to correct gradients, in jointing them, and in keeping them free from obstructions.

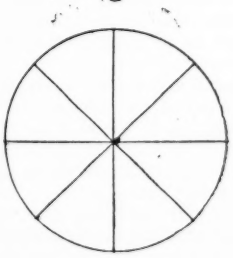
During heavy rains, peculiar to that country, quantities of mud were deposited in the trenches, and there was a risk of blocking up the sewers unless proper precautions were taken against it. There was also the possibility of fractured pipes being used in place of sound ones. Sometimes the sight-rails were knocked down and carelessly replaced without the knowledge of the clerk of the works.

Under these circumstances, no certificate of completion could be given until a very careful inspection of the lines and levels of the sewers from end to end had been made. The accuracy of the levels of the pipes where they joined the manholes was easily tested; those that were incorrect had to be relaid without further inspection; those that were correct at the manholes were further inspected as to line and level between the manholes, and for this purpose the writer adopted the method described below, which was carried out successfully in about 900 pipe-sewers.

A pipe-sewer, properly laid and jointed, should be similar internally to the inside of a cylindrical tube, without projections or obstructions of any kind; therefore, if a light is shown at one end, the same would be seen all round the perimeter at the other end if there was no obstruction.

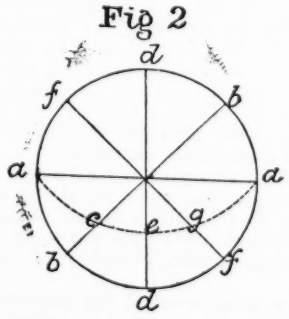
In each case where daylight was not available, a powerful bull's-eye light was placed at one end of the pipe, and at the other end lines or wires were stretched across the opening, as in Fig. 1. If the light could be seen along all

Fig. 1.



the lines the sewer was shown to be clear, and to be uniform in line and level. If the light could not be seen along all the lines a mark was made on the line at the point where the light could not be seen, and so by tracing the light along each line a diagram was obtained representing the area of obstruction to the light. For example: in Fig 2 the line *a*, *a* was

Fig 2



clear, the line *b*, *b* was obstructed at *c*, the line *d*, *d* at *e*, and the line *f*, *f* at *g*, the area of obstruction to light being below the dotted line.

The inspection was made in presence of the contractor. Many sewers were thus found to be either blocked with mud, out of line or level, or crushed. A few examples will show results:—

12-*in. Pipe Sewer, Calle San Juan.*

Diagram of Inspection No 1.

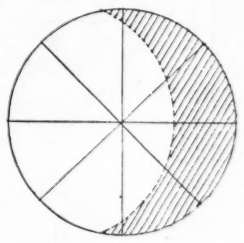


Diagram of inspection showed that the sewer was either out of line or crushed.

Result of inspection by contractor showed that the pipes had been laid out of line.

15-*in. Pipe Sewer, Calle Callao.*

Diagram of Inspection No 2

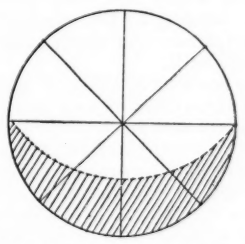


Diagram of inspection showed that the sewer was either obstructed by mud, or was out of level.

Result of inspection by contractor showed that pipe was obstructed by mud.

12-*in. Pipe Sewer, Calle Ascuenaga.*

Diagram of Inspection No 3

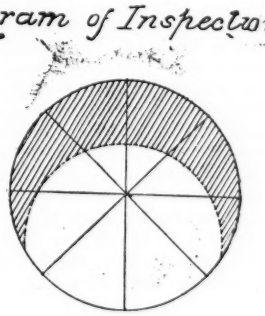


Diagram of inspection showed that the sewer was either out of level or crushed.

Result of inspection by contractor shewed that pipes were crushed.

It is not customary to give much attention to the inspection of pipe sewers after contractors have completed them, but it is obvious that such an inspection is necessary. A great many obstructions in pipe sewers are often due to mud and silt getting into them during construction, and they are only removed afterwards at great expense to the local authorities.

Brick and concrete sewers are usually thoroughly inspected inside for line and level, and for quality of work. With pipe sewers it is different, but much may be done towards obtaining satisfactory results with them if the above system of inspection be adopted.

JAMES G. KILLEY, A.M.Inst.C.E.

Proposed Railway Extension in the Lake District.—A large and influential meeting has been held at Penrith to further the scheme for making a railway to connect Ullswater directly with the London and North-Western Railway. The proposal is to make a single line from the London and North-Western main line near Yanwath to Pooley by way of Sockbridge Hall, Barton Church, and Pooley Mill. The trains would run on the main line as far as Yanwath, where they would branch off and travel on the new line. The cost of the line is estimated at 30,000*l*. The meeting, which was presided over by Mr. W. J. Marshall, passed a resolution in favour of petitioning the London and North-Western Company to construct the line.

THE SURVEYORS' INSTITUTION EXAMINATIONS.

WE have been requested to call attention to the following intended alterations in the Examination Syllabus of the Surveyors' Institution:—

"LAND AGENCY CANDIDATES.

After the Professional Examination of 1889, the new Syllabus of Agricultural Chemistry will take the place of (1) the Syllabus of Chemistry, and (2) the Syllabus of Agricultural Chemistry. The Land Agency Candidates in Division III., Sub-Division I., will, in subsequent examinations, undergo an elementary examination on the basis of Sections 1, 2, and 3 of the new Syllabus of Agricultural Chemistry; and candidates in Division IV., Sub-Division I., a more advanced examination in these subjects, as well as in the subjects referred to in Sections 4 and 5 of the new Syllabus of Agricultural Chemistry.

Candidates in 1889 in Division III., Sub-Division I., will have the option of being examined in Elementary Chemistry on the basis of the existing syllabus of that subject, or in Sections 1, 2, and 3 of the new Agricultural Chemistry Syllabus.

Candidates in 1889 in Division IV., Sub-Division I., will similarly have the option of being examined in Agricultural Chemistry on the basis of the present syllabus of that subject, or in Sections 1, 2, 3, 4, and 5 of the new Syllabus of Agricultural Chemistry; but notice of their intention must be given with the notice of candidature by all electing to be examined on the basis of the new Syllabus of Agricultural Chemistry.

VALUATION AND BUILDING CANDIDATES.

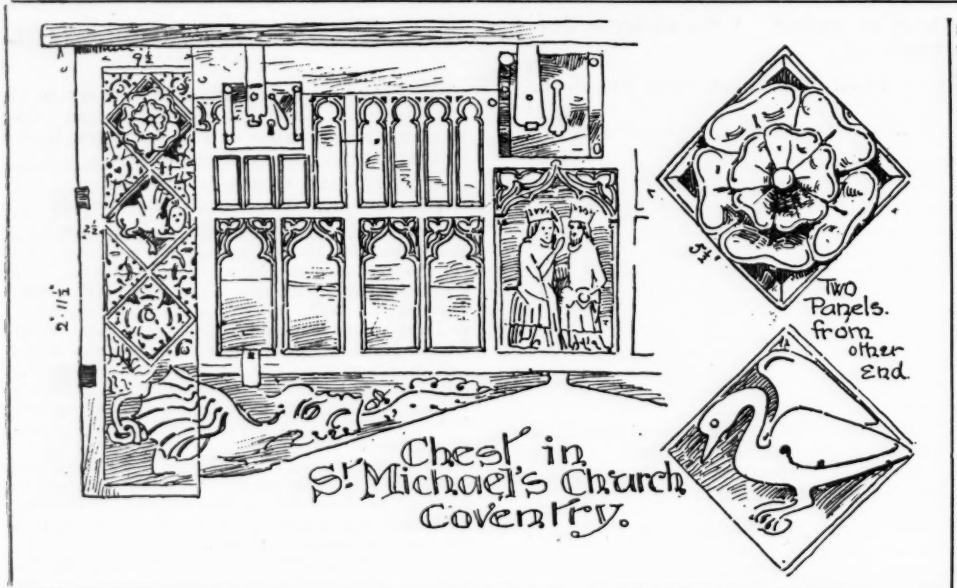
After the examination of 1889 all candidates in Division II., Sub-Divisions 2 and 3, and in Division III., Sub-Divisions 2 and 3, will be required to undergo an examination on the basis of the new Syllabus of Mensuration. This subject will, after the examination of 1889, take the place, in the Valuation Sections, of Agricultural Law, which will cease to be a subject of examination in those sections.

Valuation candidates in 1889 in Division II., Sub-Division 2, and Division III., Sub-Division 2, will have the option of being examined in Agricultural Law on the basis of the existing Syllabus of that subject, or in Mensuration on the basis of the Syllabus of that subject; but notice of their intention must be given with the notice of candidature by those electing to be examined in Mensuration in preference to Agricultural Law.

Building candidates in 1889 in Division II., Sub-Division 3, and Division III., Sub-Division 3, will similarly have the option of taking Mensuration, or of being examined on the basis of the present curriculum; but notice of their intention must be given with the notice of candidature by those electing to be examined in the new subject."

New Science and Art Institution, Walsall.—On Monday last, the new Science and Art Institution at Walsall, the foundation-stone of which was laid last year, was opened by Sir Charles Forster, Bart., M.P. In external appearance the new building has a ground plan of rather plain but substantial design. The middle floor has the windows divided into pairs and triplets, with terra cotta hood mouldings and glazed with ornamental lead lights. The top story has groups of three windows, with moulded terra cotta lintels, supported by cusped brackets. The wings at both ends have gables and geometrical panels, filled with modelled ornamentation. Internally the principal entrance opens on a spacious square hall, at the back of which swing doors give access to the corridor in which the art rooms are situated. These are 22 ft. high, and have lofty windows with a northern aspect. The first floor is devoted to class-rooms for science students, committee-room, and caretakers' apartments. On the third floor is a large lecture-hall and examination room and a chemical laboratory 71 ft. long, with the adjoining class and small lecture rooms, chemical store, and balance rooms and other conveniences. The building is warmed with a low pressure hot-water apparatus. It will cost about 5,500*l*., and has been erected from the designs of Messrs. Dunn & Hipkiss, of Birmingham, by Messrs. Barker & Son, of Handsworth.

Manchester Ship Canal.—On Saturday the 22nd inst. upwards of 240 members and friends of the Manchester Association of Engineers visited the Eastham Section of the Manchester Ship Canal Works, under the direction of the President, Mr. Samuel Dixon. On arrival at Eastham the party was conducted over the greater part of the works, the chief engineer kindly explaining the salient points of the scheme during the journey.



CHEST IN ST. MICHAEL'S CHURCH, COVENTRY.

THIS is a sketch, with one or two details, of a rather characteristic late Gothic chest at St. Michael's, Coventry.

Illustrations.

SPADA PALACE, ROME.

THE Spada Palace, now the "Court of Cassation," was begun by Cardinal Capo di Ferro in 1564, from the design of Giulio Mazzoni. It was finished from that of Borromini, who appears to have thought the work of his predecessor too plain, and has covered the building with a mass of ornament in very questionable taste. The chief treasure of the place is the statue, of heroic size, generally held to be that of Pompey, at the base of which Cæsar was murdered.

Our illustration is of a part of one of the façades to the chief courtyard immediately above the colonnade.

SAN GREGORIO, ROME.

SAN GREGORIO, on the Coelian Hill, is a little-visited church, attached to an abbey which is the headquarters of the Camaldolese monks. It was rebuilt by Francesco Ferrari in 1734, but sixteen granite columns in the interior are ancient, and probably re-used from the earlier building, founded in the seventh century, on the site of the home of St. Gregory. Its chief treasures are fresoes by Guido and Domenichino; but the church and the atrium attached to it, which was erected by Soria in 1633, contain besides many sepulchral monuments and fragments of Renaissance sculpture. St. Augustine and some of our earlier archbishops were educated in the abbey to which the church belongs.

STAIRCASE, STOWELL PARK, GLOUCESTERSHIRE.

THE staircase itself, which is illustrated in the present number, is old work, as well as the handrails and balusters, and has only been slightly altered in its arrangement; it is of ash. All the panelling to the walls, with the plaster frieze and ceiling, is new work recently carried out. Mr. John Belcher was the architect; Mr. Groves the builder.

The drawing from which the illustration is taken was in the Royal Academy Exhibition of this year.

NEW PARISH CHURCH, TEDDINGTON.

THE large church now being erected at Teddington closely adjoins, and is intended practically to take the place of, the small brick building which has hitherto served as the parish church. The latter, which there is no present intention of destroying, is of small interest in itself. Teddington was formerly a chapelry to Staines, and the chapel of St. Mary as built, or rather rebuilt, in the 16th century—of brick with stone dressings—now forms the south aisle of the old church, which has been added to at various times—notably by Dr. Stephen Hales in the last century, when the north aisle and the little tower were built.

Towards the erection of the new church two residents gave large donations on condition that the scheme should have for its object something more than the common-place suburban church. In making the design the architect was required to provide an apsidal east end, with aisle round it, and to make the general proportions narrow and lofty. The complete scheme includes a nave of seven bays with a western vestibule beyond it, a baptistery and a tower. At present the chancel and five bays of the nave are in progress, the superstructure having been begun in the autumn of 1886. The building will be groined in stone throughout, the main vault being 70 ft. 6 in. to the apex. A double chancel arch adjacent to the transverse ribs separates the nave and chancel. The thrust of the upper vault will be sustained by flying buttresses. The vestries are made larger and more complete than is usually the case. Doulting stone, supplied and worked by Messrs. Trask, is used throughout. The roofs will be covered with copper. The foundations, of Portland cement concrete, were made a separate contract, and cost 1,062*l.*, the main piers being carried down to the London Clay. The contract for the first portion of the superstructure was about 19,000*l.* in amount. Mr. William Niven, F.S.A., is the architect; Messrs. Adamson & Sons, of Putney, the builders; and Mr. H. Luscombe the clerk of works.

OLD COTTAGE ARCHITECTURE.—VI.

ONE of the principal features of old cottages and houses in Surrey is the skilful arrangement of the chimneys.

In this respect, this little corner that I am illustrating is, I think, equal to anything in England. In stone countries the chimneys are seldom a feature of interest, and, although elsewhere more elaborate brick chimneys may be found on the larger houses, I know of no district where there is more variety of the humbler kind worthy of close study.

In the older cottages, where rough stone was used before brick was plentiful, the chimneys were generally of plain character, but with the general use of brick a more ornamental treatment became usual.

There are two classes of chimneys; the inside chimney, showing only in a shaft appearing through the roof, and the outside chimney, which usually stands clear of the house wall and is of large dimensions and usually of ornamental treatment.

The base generally contains a chimney-corner or ingle-nook, or, at any rate, covers a wide opening, and the manner in which this is narrowed up to the shaft gives rise to an endless variety of picturesque treatment. The slopes are generally covered with tiles, and the edge of this tiling commonly concealed by a parapet of crow-steps.

The illustration I give of one chimney at Unsted Manor (fig. 1) will illustrate this, and also the way in which the crow-steps are formed.

Owing to the ease with which the top brick is displaced these crow-steps have in too many cases been destroyed, and nothing but the square bases remain. It is astonishing how universal this ornament was. It will be constantly found attached not only to old houses, but on old chimneys to which most prosaic

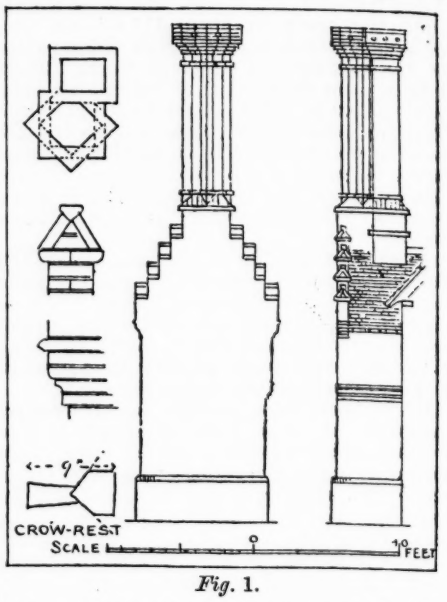


Fig. 1.

modern brick cottages have been added. The accompanying cut (fig. 2) shows an unusual elaboration on the old timber house at Gomshall.

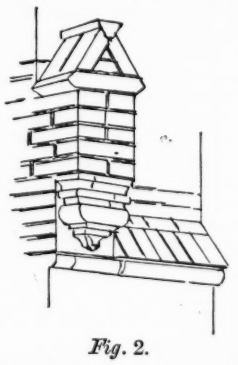


Fig. 2.

My sketches show a number of varieties of these outside chimneys, which might be largely increased by excellent examples where the building attached is not so interesting.

An essential feature of this outside chimney is the span roof behind them. This sometimes serves to give headway to the fireplace inside, and in any case serves to throw off the snow and rain, and is also most important to the general effect.

The mutilated ornaments in the head of the chimneys at Unsted are doubtless the remains of "crow-rests," such as may be seen in the fine chimneys of Abbott's Hospital at Guildford. They consist of a brick cut where projecting to a slightly tapering cylinder.

Unfortunately, in building new cottages one is generally debarred on economic and utilitarian grounds from the use of these outside chimneys, and there is perhaps more to be learnt from the treatment of what I may call the roof chimney.

One form of these is that in which the shafts starting from a solid block are slightly detached, or are set diagonally, as shown in several sketches. In another form the block has round arched panels, as at Abinger and Compton. This form, however, is not common in the neighbourhood.

In some cases the block is simply ornamented by projecting the wythes 2¼ in. Great strength is gained by this plan if care be taken that these projecting wythes are built alternately solid and closure, and not all closure bird's-mouthed to the block, as I have known done in new work. Most commonly the projection is square, but occasionally diagonal.

By far the majority of roof-chimneys depend for their picturesqueness on the skilful arrangement of the flues by which, instead of appearing as a square block, the shafts present a number of angles, thus gaining a variety of light and shade.

This is a great secret of the success of the old chimneys, and one that is seldom met in new work, owing partly to the natural symmetry that results from the usual arrangement of cottages in pairs.

In the old cottages this disposition is not at all haphazard, but the result of careful study, and it is surprising what a variety of forms are

to be found. I give three examples (fig. 3) and many others may be found in the lithographed sketches.

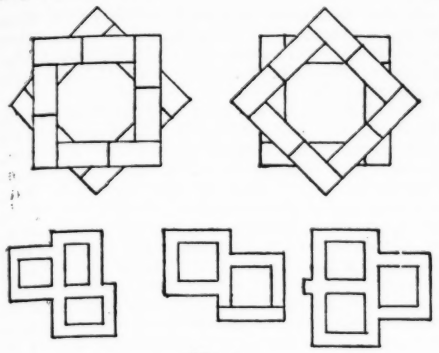


Fig. 3.

The careful manner in which these lines of light and shade are studied may be seen also in the arrangement of the shafts of the chimney at Unsted. The charming effect of such "star" chimneys formed by the crossing of two squares is, however, best seen when the shaft is detached and the star complete; there is an excellent example at Wonersh. I give a diagram showing the jointing of alternate courses. Another feature to be noted in the roof chimneys is the manner in which when the ridge does not butt against the chimney-block, one side of the roof is prolonged above the ridge till it meets the chimney. The necessity for a gutter between the ridge and the chimney is thus avoided. A striking instance of this is to be seen on the cottage at Easbing shown in my first number, and in a modified degree it is a constantly-occurring and often picturesque feature.

The flues of the larger outside chimneys are 18 in. by 18 in., or 14 in. by 14 in., and of the roof chimneys 14 in. by 14 in., or 14 in. by 9 in., but at Dunsfold are some very elegant shafts that can have only 9 in. by 9 in. flues. This small size is, however, quite exceptional. In explanation of the sketches I may say that it is common to find shafts of late date carried up from the coppers 12 in. by 12 in. outside, and formed of brick on edge.

A small point not to be neglected is the way a course of bricks is always projected where the chimney clears the roof; these courses come naturally at a different height at front and sides, and add to the picturesqueness and still more to the usefulness by throwing the drip clear from the flashing. The flashings are of mortar, and must have been very ineffectual at first. Time, however, has given to mortar as to tiles and bricks a coating of almost invisible vegetable growth that effectually turns the wet. No new local brick will keep out the wet, and people are generally aghast at the quantity of water that may be absorbed by new tiles, forgetting that old bricks and tiles were just as bad before they acquired this coating.

While speaking of flashings, I must mention an interesting survival of old ornament in the pattern drawn in the country districts on the flashings with the point of the trowel. This is, however, rapidly becoming an extinct practice.

The heads of the sixteenth and seventeenth century chimneys are usually carefully formed

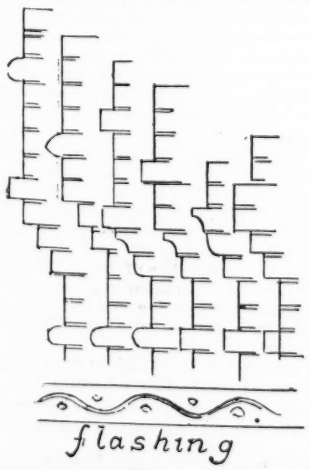


Fig. 4.

of projecting bricks, the number of which and the arrangement vary with the size and importance of the shaft. As a general rule the bricks are square, but occasionally, and especially about Shiere, simply moulded bricks are used. These are the half-round for neckings, the quarter-round, and the cavetto. I give a few examples of heads (fig. 4). It must always be remembered that the old bricks are thinner than the usual modern brick, and if these heads are exactly repeated the effect is much too heavy. This is a fact well understood by such masters of the style as Mr. Norman Shaw, who get over the difficulty by reducing the projection or by using moulded bricks. For the same reason it is dangerous to let the heads follow the projections of the wythes, as is usual in the old chimneys.

The bricks at Unsted are only 2¼ in. thick, and four courses do not make a foot; later on the bricks were made 2⅓ in., and the usual ½ in. joint brought the course to the convenient standard of 3 in. The beauty of old brickwork depends largely on these ½ in. white joints. It is not only the small size of the bricks, but the large size of the joints, that gives the effect which it is so impossible for that reason to achieve in modern work.

This beauty of the white joints has been fully recognised in the charming drawings of Mr. Railton and others, who have made it a leading feature.

I do not think chimney-pots were used on the old chimneys, but the hoods of brickwork often met with may be of old date. Later on, chimney-pots were used, and the ornamental heads reduced to two or three courses at most.

My subjects of this week are taken from a district rich in good examples, namely, Dunsfold and Chiddingfold, in the weald of Surrey. The latter must have been of some little importance, since it is the first recorded locality in England for the glass manufacture, and much glass for Westminster Abbey came from it. There were also very early tile and brickworks in the neighbourhood. Doubtless, the great increase of building in the sixteenth century made the glass trade brisk and the place prosperous.

The Crown Inn is a very old house, and has a fine framed king-post roof over what was originally the hall. The overhanging building at the back is canted in a curious way to follow the line of an old lane or passage; the porch is a recent addition.

The Rev. T. F. Cooper, who is preparing that most useful antiquarian work, an exhaustive parish history, tells me that deeds which he has copied speak of a building here in A.D. 1383; and, no doubt, the hall is that mentioned in these. Another deed of 1548 speaks of the additions lately made to "le Croune."

It is always a sign of antiquity when the corner post has the bracket carrying the projecting framing carved out of the solid. This was managed by using the butts of oak trees placed upside down, and by then carving the spreading bases into corbels. In later times there was a great deal more economising of wood, and of labour, too, and this feature is seldom found. I have, however, found it existing to some extent in internal posts where there was no particular structural object, and it has, I believe, been suggested that the wood dried better when placed in this position. Another sure mark of antiquity is the steep roof, such as that at Combe Farm. Sixteenth century roofs are seldom at a greater angle with the base than about 48 degrees, while the earlier as constantly approach 60 degrees.

The timber house at Burningfold is, perhaps, the best in the district after Tangley, but it has not the rich detail of this latter, nor its picturesque accompaniments. The quarterings are of the circle arrangement, as at Tangley and elsewhere, with another pattern that occurs also at Bramley, as shown in my third number. The room under the rustic verandah contains some good oak panelling.

Field-place I show as a picturesque grouping of roofs. Some former owner commenced to rebuild his old house, but never got further than an odd-looking high block at one end.

The nice little cottage on Dunsfold Common seems doomed to destruction, though by no means in bad condition and desirably situated. The little window in the angle is one of those mentioned previously that have diagonal oak stancheons and no glazing, being closed with a shutter.

This, and one of those at Chiddingfold, and that at Cranleigh, may be compared as variations on the same general plan. The artful way in which the gablet is introduced to the lean-to at the near end of the Cranleigh cottage is worthy of notice.

The addition of tall chimney-pots to this cottage would give it a very good outline.

R. N.

THE INSTITUTE ON RESTORATION.

SIR,—I shall be glad to be allowed to correct a misapprehension in your article of Sept. 22, on "Restoration and Ruination." It is there hinted that the paper lately issued by the R.I.B.A. represents chiefly "the judgment of two eminent church architects."* Now the facts are these.

Early in last spring, as secretary, I brought before the Art Committee a proposal for issuing a circular on this subject similar to that lately sent out by the Society of Antiquaries, but dealing more practically with the question. The committee adopted the proposal, and at the suggestion, and with the active co-operation, of the vice-chairman, Mr. Herbert Carpenter, I drew up a paper repeating the original circular of twenty years back, but adding thereto such explanations and elucidations as experience had shown were absolutely necessary to prevent great damage that had resulted from a misinterpretation of the somewhat vague terms of that document. On the suggestion of the Art Committee the Council appointed a special committee to consider this draft.

There can be no harm in my mentioning their names, and it is certainly due to the profession that there should be no false idea on the subject that might impair the usefulness of the circular. This committee consisted of Messrs. Christian, Pearson, Blomfield, Carpenter, Loftus Brock, and myself, and may, I think, be considered fairly representative.

The proposed circular was most carefully gone through by each of these gentlemen, and the result as so modified was reported to the Art Committee. They again somewhat modified portions, and it was then adopted with but one dissentient, who objected to the form.

It was then sent up to the Council, and after some doubtless unavoidable delay was by them recast into its present shape. I may be excused, as in some way a fond parent, for thinking that they have not improved it, though the alterations are but slight.

I think this history will show that the circular may fairly be taken as expressing the views of those of the Institute who have particular acquaintance with this matter, as each of those who have had a voice in it could probably speak with authority for several others. That there may be many in the profession who will not approve is possible, and there is a possibility, of course, that they may be right, but the balance of authority is certainly with the church architects and antiquaries. This small privilege need not be grudged them; one would not advance their opinions as of particular weight on a question of quantities or of iron construction, as to which one would naturally go to those familiar with their use.

With regard to the policy of the circular, I cannot help thinking that the more close the knowledge of the subject, the more hearty will be its approval.

These are rules for ordinary guidance, and there is nothing in them that would prevent the carrying out of an important work, if it were maturely and deliberately decided on as necessary and desirable. But no one familiar with our country churches can think, in spite of your article, without burning indignation of the wanton mischief that has been done. The whole question turns on whether the historical interests of the Church and its art are not, under the circumstances, worth more than the practice of modern architecture, which, after all, has ample scope side by side with the other. Even the ancients thought their Wolf of the Capitol, and many other archaic remains, worth preserving, though they could certainly have replaced them with better art.

That some things might allowably be destroyed or replaced is quite possible; but then comes in the thin end of the wedge, and in the difficulty as to who is to decide, irreparable mischief is done. Too strict an adherence to architectural principles would dictate our pulling down nearly all the old churches and rebuilding them in a more convenient form. But who will propose this? And yet it is certainly the logical course to take.

For fear of making this letter too long, I must say no more, except as to one little point, namely, that of course, as your note suggests, the reference to floors on the slant is to such as are deliberately and for particular reason so set.

RALPH NEVILL, F.S.A.

* The "misapprehension" is certainly not our fault: it was distinctly implied, in a letter from the Secretary of the Institute to the *Times*, that the "General Advice" was mainly compiled or directed by two eminent church architects, whose names were given.—ED.

ANCIENT CROSS AT GLOUCESTER.

IRISH VERSUS SCOTIC AND SAXON.

SIR,—I have seen the illustration of this cross in the *Builder*, and have read the judicious note thereon by Mr. Medland. I have also read the letter on the subject from Mr. John L. Robinson, of Dublin, which appeared in your last issue.

Mr. Robinson's views might have done for thirty years ago, but they will hardly pass at the present time: his knowledge of the history of Irish art and his judgment of its artistic qualities appear to be confused and unreliable.

I should like to ask, in the first place, what is his authority for stating that the cross at Gloucester is "the work of Irish hands"?

In the second, what is his authority for saying Ireland was "then called Scotia"—that is, in the seventh century (A.D. 642, the date of Oswald's death)?

Third, what is the proof that Columba brought Irish artificers with him to Iona?

Fourth, in what respects are the crosses at Monasterboice and Clonmacnoise, identical with the Saxon crosses found at Peterborough?

Fifth, how does Mr. Robinson know that the crosses scattered through England are "Celtic remains"?

To the first question Mr. Robinson cannot be able to give any reply that will support his assertion—for a very good reason. At the date of Oswald's death (642) Irish hands and Irish heads knew nothing whatever about this interlacing ornament. It was not introduced into Ireland till the year 667, when Colman of Iona and Lindisfarne took "alone with him all the Scots he had assembled in the isle of Lindisfarne, and also about thirty of the English nation," and settled with them in the west of Ireland. These Scots and English founded the school of art in Ireland, though there were, doubtless, Gothic Scots from Scotland in Ireland before that date.

The earliest Irish sculptured cross whose date can be fixed is that of Tuathgal, Abbot of Clonmacnoise. It belongs to the year 806. It is not likely that even this Irish cross was the "work of Irish hands," for it was the production of the Scotic and Saxon colonies settled in Ireland. Out of compliment to this colony the name Scotia was *afterwards* sometimes given to the country they inhabited, by their fellow monks of other countries. This name, when applied to Ireland, was quite understood to be a poetical appellation, and not the real name of the country.

Bede always speaks of the country now called Ireland as Ireland, and of the country now called Scotland as Scotland. His editors, however, have been good enough to correct him when he did not err, and in many cases where he has written Scotland they have been so obliging as to write in brackets (Ireland), and thus have done their best to make nonsense of the text. I am quite well aware that Mr. Skene says that "prior to the tenth century the name Scotia was exclusively applied to the island of Ireland"; but Mr. Skene is quite wrong in this, as he is when he states that "the name of Scotland, whether in its Latin or its Saxon form, was not applied to any part of the territory forming the modern kingdom of Scotland till towards the end of the tenth century."

Even if this statement were correct, it would prove nothing, for the name "England" is not used at all in the chronicles of those times till the last decade of the tenth century, and was not applied definitely to the territory of the modern kingdom of England till the beginning of the eleventh century.

But it is easy to show from Bede's history that Skene and his followers are wrong in saying that no part of modern Scotland bore the name of Scotland till towards the end of the tenth century.

Bede finished his history in the year A.D. 731, which is considerably before the end of the tenth century. Treating of events which happened in the year 635, he says Oswald, king of the Northumbrians, "sent to the elders of the Scots, desiring they would send him a bishop. Nor were they slow in granting his request, but sent him Bishop Aidan. . . . Aidan himself was a monk of the isle called Hii (Iona), whose monastery was for a long time the chief of all those of the Northern Scots (b. iii. c. 3). Aidan resided (while in Northumbria) in the isle of Farne. . . He died in the seventeenth year of his episcopacy. . . Finan, who had likewise come from the same monastery of Hii in the Scottish isle (Iona), succeeded him (b. iii. c. 7). But after the death of Finan . . . . when Colman, who was also sent out of SCOTLAND, came to be bishop, a greater controversy arose about the observation of Easter (b. iii. c. 25). Colman, perceiving that his doctrine was rejected . . . took with him such as would not comply with the Catholic (or Roman) Easter, and went back into SCOTLAND" (b. iii. c. 26).

Here is another example from Bede (b. iii. c. 21 and 24):—"Diuma died among the Midland Angles . . . . and Coellach, of the Scottish nation, succeeded him in the bishopric. This prelate, not long after, returned to the island of Hii (Iona), which among the Scots was the chief and head of many monasteries. His successor in the (Mercian) bishopric was Trumhere, a religious man, and educated in the monastic life of the English nation, but ordained bishop by the Scots (c. 25). Diuma was made the first bishop of the Mercians; he died, and was buried among the Midland Angles. The second was Coellach, who quitting his episcopal office whilst still alive, returned into SCOTLAND, to which nation he belonged as well as Bishop Diuma. The third was Trumhere, an Englishman, but taught and ordained by the Scots"—A.D. 652 (b. iii. c. 24).

At this time the Scots kept to the old manner of reckoning Easter, while the newer churches of England and Ireland accepted the method lately enjoined by Pope Honorius.

Coelfrid, a later abbot of Northumbria, writing to Naitan, King of the Picts, who wanted his religion to be of the latest Roman fashion, says:—"This I said to Adamnan (abbot of Iona), who indeed showed how much he was improved upon seeing the statutes of our churches, when, on returning into SCOTLAND, he afterward, by his preaching, brought great numbers of that nation over to the Catholic (Roman) observance of the Paschal (Easter) time; though he was not yet able to gain the consent of the monks that lived in the isle of Hii, over whom he presided" (b. v. c. 21)—A.D. 710.

The entry in the Anglo-Saxon Chronicle for the year 933 reads:—"This year King Athelstan went into SCOTLAND, as well with a land army as with a fleet, and ravaged a great part of it."

England is first mentioned in the same Chronicle sixty-two years later,—that is, in the year 995:—"This Alfric was a very wise man, so that there was no so sager man in England." This is vague, and may mean anywhere; the next is better defined:—"A. 1002 . . . the King ordered all the Danish men that were in England to be slain."

The name "England" does not occur at all in Bede's history, which was completed in the year A.D. 731. He mentions the English race, the English nation, the West Saxons, the Mercians, the Midland Angles, Bernicians, and Northumbrians, but Britain, never England, is the usual territorial name in all Bede's history, as well as in the Saxon Chronicle up to the beginning of the eleventh century.

Ireland is mentioned about a score of times by Bede, and always as Ireland, never as Scotia. The Anglo-Saxon Chronicle mentions Ireland once as Hibernia, and several times as Ireland, not once as Scotia.

Bede, on whom the Celtists rely for support, gives them in reality very little, but Bede's editors give them abundance. In most of the headings to the chapters,—which are not by Bede, but a later hand,—"Scotland" is substituted for Ireland. Thus, in b. iv. c. 4, we read in the heading that Colman "built two monasteries in Scotland." In the text itself we find that "he retired to a small island to the west of Ireland," where he built a monastery, and another on the mainland of Ireland. Bede, from this treatment, is, to a careless reader, a mass of confusion. Scotland and Ireland are, at first sight, inextricably mingled; but a very little study enables us to separate the chaff of the editors from the wheat of the author.

Some of the pious endeavours of his editors seem to have arisen from their desire to make Bede's history in accordance with the fictitious early Irish Christian civilisation claimed by some Irish writers.

Ireland has undoubtedly traditions of early history and civilisation which stretch back to the Flood. These traditions are coherent, and quite reconcilable with the facts obtained from independent studies of race migrations; but they all refer to a period long before the Christian era. This ancient civilisation, if it ever existed, was swept away by the many waves of invasion to which Ireland had been subjected. Ireland, from some time before the Christian era up to the coming of St. Patrick, was in anything but a civilised state, if we may credit the Greek and Roman writers who have condescended to notice it.

Strabo says the Irish are savages more wild and unpolished than the Britons, Mela that they are the most uncultivated of all nations. Solinus calls them "a nation void of humanity, unhospitable, and in every way barbarous and atheistical." These are, no doubt, exaggerations; but if the Irish, in the early centuries of the Christian era, "were the generous, polite, and literary people" our Celtists think they were, it is impossible to imagine that the unbiassed classic writers could so grossly misrepresent them. The evidence of Nennius goes to show that the Irish were entirely heathens when St. Patrick, in 452, left Scotland to go among them. Columba built a monastery in Derry previous to the year 565, and in 667 Colman built two monasteries, one for the Northumbrians and one for the Scots. These last formed a school of art and religion, which flourished till the interference of Henry II. of England in the twelfth century began to reduce Ireland again to savagery. Irish Christian civilisation began in the fifth century with the preaching of St. Patrick; its Christian art began in the seventh century. Christian art and culture did not come from Ireland to Scotland or Britain, but went from Scotland to South Britain and to Ireland. This is made clear enough by the study of the histories of Bede and Nennius, and the Anglo-Saxon Chronicle. None of these books can be said to be biassed in favour of the Scots of Scotland.

In the year A.D. 156, Lucius, king of the Britons, sent a letter to Eleutherius, who presided over the Christian Church at Rome, asking that he might receive the Christian faith. The faith thus introduced was preserved in peace and tranquillity until the time of the persecutions by Diocletian (Bede, b. i. c. 4, 6).

In 394, St. Ninian went as missionary from Rome to the southern Picts or Scots, and converted them to the faith. He built a church in Whithorn, Wigtonshire (Bede, b. iii. c. 4, and "Anglo-Saxon Chronicle, 565).

In 430, Palladius was sent by Pope Celestine "to the Scots, who believed in Christ, to confirm their faith; he died in the land of the Picts" at Fordun, in Scotland (Bede, b. i. c. 14, Anglo-Saxon Chronicle, 430). One of the editors of Bede, commenting on Palladius, and, with a fine feeling for hazy effect, mixing him up with St. Patrick, says, "Palladius and Patricius have sometimes been confounded together, so that it is difficult to assign to each his respective share of merit in the conversion of the Scots of Ireland." As Fordun, in the land of the Picts, is assuredly not in Ireland, as Palladius never set foot on Irish soil, and as St. Patrick is known as the peculiar apostle of Ireland, it is not so difficult to separate Palladius from Patrick as the learned editor seems to imagine.

Nennius tells us, "The death of Palladius being known . . . . Pope Celestine sent Patrick to convert the Scots to the faith of the Holy Trinity . . . . he arrived in Britain,* where he preached for some time . . . . Having filled his ship with foreign gifts and spiritual treasures by the permission of God, he arrived in Ireland, where he baptised and preached." A.D. 452.

As this is absolutely the first mention of Christianity in connexion with Ireland, it is obvious that the Irish were later than the Brito-Romans and the Scots in receiving the Christian religion. According to the Anglo-Saxon Chronicle, "in the year 565" Columba came from the Scots among the Britons, to instruct the Picts. Bede calls them "the northern Picts, who are separated from the southern parts by steep and rugged mountains: for the southern Picts (the Scots), who dwell on this side of those mountains, had long before, as is reported, forsaken the errors of idolatry, and embraced the truth by the preaching of Ninias (A.D. 394)."—(Bede, b. iii. c. 4.)

While the Christian churches in Scotland were being thus settled and confirmed, the Saxon wars made havoc with those Brito-Roman churches of South Britain which had survived the persecution of Diocletian; it may be said that Christianity disappeared as the Saxons established themselves. But a partial revival took place in Kent in the year 565, and in 596 St. Augustine was sent to the same district. On his journey, he and his companions were seized with a sudden fear, and began to think of returning home, rather than proceed to a barbarous, fierce, and unbelieving nation. (Bede, i. 23.) In 635, Oswald, King of the Northumbrians, who had been a refugee in Scotland, and was baptised there, asked the Scots to send him a bishop to convert the Northumbrians. Aidan, from Iona, was sent; when he died, he was succeeded by Finan, whose successor was Colman. All these three were Scots, educated at Iona. (Bede, b. iii. c. 3, 17, 25, 26.) The first two bishops of the Mercians, or Midland Angles, were also Scots from Iona. The third was an Englishman educated in Scotland. (b. iii. 24.)

Early religious culture, we see from these extracts, proceeded from Scotland, and was not imported from Ireland. Artistic culture in Britain and Ireland also came from the same source.

Scotland possesses monuments which are believed to have been erected in a period before the Christian era;† many of them are certainly pre-Christian. The earliest of these sculptured stones are found in the country between the Dee and the Spey, while those between the Dee and the Tay belong to a somewhat later, but still very early, period. When Columba obtained from the Pictish king the island of Iona, he without doubt carried with him, among his converts, to the island, Pictish artificers and artists. As Iona does not present any of the earlier forms of Scotic sculpture, it is evident that the style had made great progress before the coming of Columba, and had developed the interlacing knot-work which is not seen in the earlier form of Scotic art. Iona was not only a school of religion, it was also a school of art. When Aidan, Finan, and Colman went as successive bishops to Northumbria, they introduced not only the religion but the arts of the Scots. The "Gospels of Lindisfarne," which were executed in Northumbria during their episcopal rule, are still extant.‡ The earliest sculptures of Northumbria have all the characteristics of the Scotic crosses of the middle period; Northumbrian sculpture, however, develops later into the Anglo-Saxon style, in which there is a strong infusion of Byzantine or Continental art.

When Colman, the third bishop of Northumbria, refusing to accede to the newer Roman style of calcu-

* South Britain at this time was in a very unsettled state and almost entirely pagan.

† The early monuments of Scotland have no Christian or Biblical emblems; they are enriched with hunting and battle scenes; they are not pierced, but are solid slabs. The Irish crosses, corresponding with the later Scotic monuments, are pierced, and have usually Biblical subjects.

‡ Early gospels, or small works in metal, found in Ireland prove nothing, as they may have been imported from other countries. The oldest, the Gospel of Patrick, would be carried by Patrick into Ireland.

lating the time of Easter, resigned his bishopric and went back to Scotland, "he took along with him all the Scots he had assembled at Lindisfarne and also about thirty of the English nation, and leaving some brothers in his church, he repaired first to the island of Hii (Iona), whence he had been sent to preach the Word of God to the English nation. Afterwards he retired to a small island which is to the west of Ireland. . . . . Arriving there, he built a monastery, and placed in it the monks he had brought of both nations." Owing to the travelling propensities of the Scots, the two nations did not agree, and Colman built a monastery for the English monks at Mageo, now annexed to the archbishopric of Tuam, while the Scots remained in the monastery on the island of Inisbofinde. (Bede, b. iv. c. 4, A.D. 667.)

Thus the arts of Iona and Lindisfarne were introduced to Ireland, and thus Irish Christian art took its rise. Ireland can show no specimens of sculptured Christian art done previous to this date, and the strong resemblance which is observable between several phases of Scotic art and the art of Ireland is due solely to the fact that the so-called Irish, or Celtic work, was actually executed by Scottish and English monks working in Ireland. The later Irish work may have been done by Scots or Angles or by Irishmen who reproduced and developed the Scotic designs which had been introduced by Colman and his Scottish and English monks. The incontrovertible fact remains that all Irish Christian art is due directly or indirectly to the Scotic school of art established in Iona. This in its turn was at first a direct reproduction, and afterwards a development, of the Scotic and Pictic art which had been created in pre-historic time in the north-eastern districts of Scotland. Probably this in its turn was a development of the Danian art, and was introduced into Scotland by the Picts, who are generally believed to be of Scandinavian origin.

Now, it is clear that if the birthplace of this interlacing work is to be found in the Gothic provinces of Scotland, and a connexion is established between these provinces and Scandinavia, it can scarcely be correct to speak of these works as Celtic. (The Celts who reached England about 350 years before Christ came from Celtic Gaul; they never had any settlement in Scotland north of the Forth and Clyde: for the reason that they were opposed by the fiercer Goths, who had descended on Scotland from the north and east. The Gaëls or Highlanders are not Celts or Goths, but are relics of an older race, who had possession of all Britain before the coming of the Goths and Celts. The true Gaël is dark, the Goths and true Celts are both races of Japhetic origin, and are, or were, light complexioned. Cæsar confounds the Gauls with the Celts, and has thus brought confusion into the matter. The Gauls of France, the dark-haired Silurians of Wales, and the Gaëls or Highlanders of Scotland are allied races,—of prehistoric settlement in their respective countries. The Celts only made their appearance in Western Europe in 450 B.C.)

If this ornament were of Celtic origin, we should find it in all its phases in Celtic or North-western Gaul or in Celtic Wales; but it is very uncommon in these countries, and the specimens existing can be traced directly to the influence of Scotic, Gothic, or Norse invaders.

Further, the people who executed the works in Ireland do not seem to have been Celts, but Gothic Scots and Saxons.

According to the last book on the subject of Early Christian art in Ireland, "There is no evidence whatever to prove that such sculpture as we find upon the high crosses in Ireland was executed here before the tenth century. The ornament upon the sepulchral slabs, which date from the seventh to the tenth century, is incised.

The date of these fine monuments (the high crosses) in Ireland may be limited to a period ranging from the tenth to the thirteenth century."

This deduction agrees perfectly with the true history of the introduction of the art as revealed by a study of Bede.

Will Mr. Robinson explain how work executed from the tenth to thirteenth century in Ireland could have formed the model for work done in the seventh and preceding centuries in Scotland and England? This is virtually what the Irish claim.

J. MOYR SMITH.

GLASGOW DRAINAGE AND THE POLLUTION OF THE CLYDE.

SIR,—I read with much interest the instructive article upon this subject in your issue of the 15th inst., and think that, as regards Glasgow, the following words from page 187 are particularly applicable, viz. :—"The problem of ridding a large town of its sewage did not admit of an economic solution." On page 189 the plan of keeping the sewage out of the river and discharging it into the sea on the Ayrshire coast is recommended as the best and most economic in the long-run.

Until it is able to face this, Glasgow may as well do nothing but rest on its oars, watching the result of the London experiments, &c.

Some people have been trying to put pressure upon the Glasgow authorities to hurry on with the purification of the Clyde, on account of the damage asserted to be done to Loch Long and its shores by the deposit of the present dredgings at the mouth of the Loch; but I consider that, supposing the deposit of these dredgings in Loch Long was stopped to-morrow, there would be no appreciable benefit to either the Loch or its shores. The greater part of the dredgings is merely sand or clay and stones, and these are deposited where the water is about 200 ft. deep, and about three-quarters of a mile or so from the shore, and do no harm. I boarded a dredger lately which was lying undischarged at the mouth of the Loch, and took the stuff into my hands, and it had no bad smell, nor was it at all offensive, being simply sand with a mixture of clay in it, which, of course, discoloured the water. The chemical refuse that was discharged previous to Mr. Fletcher's Report in February last was offensive, but it is now stopped, and I understand the fishing this season in Loch Long has been exceedingly good. The depositing of the dredgings in Loch Long is not, therefore, a crying evil, but the filthy state of the river at the harbour, and for several miles below it, is the real nuisance for which a remedy is wanted.

Sept. 22, 1888. W. P. BUCHAN.

A FORTH AND CLYDE CANAL.

SIR,—Reverting to this subject, the nation ought to feel indebted to you for your elaborate and powerful article (Sept., 1884) in favour of a grand State canal between the Forth and the Clyde, deep enough for the largest merchant steamships and available for warships, which I understand can be formed for 8,000,000*l.* or so; that is, it would cost, with a trifle for repairs, at the present rate of borrowing with such security, only about 250,000*l.* per annum—a mere nothing, compared with its commercial utility, apart from its being of vital advantage in war-time (which may be approaching all too soon), looking to our discreditable, infatuated unpreparedness. R. A. MACFIE.

DISSENTING CHURCH BUILDING NEWS.

Leeds.—A new Wesleyan Chapel in Dewsbury-road, Leeds, the foundation-stone of which was laid in October of last year, was opened on the 12th inst. The chapel has been built of pressed bricks, with stone dressings, in the Italian style of architecture, and is arranged to accommodate 800 adults. It is 75 ft. long, 48 ft. wide, and 33 ft. from floor to ceiling. The entrance to the ground-floor is from a front central lobby connected with two inner lobbies communicating directly with the chapel. Access to the gallery is from two side entrances also at the front, by means of stone staircases. The woodwork internally, including the pulpit, is of pitch-pine varnished. The ceiling is panelled and enriched in plaster, and finished with a cove next the walls. The architect was Mr. G. F. Danby, of Leeds, and the total cost, including the land, is about £4,200.

Leytonstone, E.—In April plans for the Wesleyan Chapel extension and schools were invited in competition from six architects, and on the advice of the referee those submitted by Mr. George Baines, London, were selected. Since this decision the committee have purchased an adjoining house, and propose to carry out a much larger and more comprehensive scheme in sections, from the design of the above-mentioned architect. Tenders for the main school-room and chapel extension have been accepted, the work to commence on the site March 1.

The Student's Column.

ARTIFICIAL STONES.—XIII.

Concretes (continued).

BUILDINGS formed by the compacting together forcibly of successive layers of béton by means of rammers are numerous and important, especially in France, and each structure is a veritable monolith,—a true concrete building,—which, as the late Mr. Geo. Godwin remarked some years back, is a very different affair from one formed of concrete blocks. A modification of the process for wharfs, dams, &c., consists in making the walls hollow or honeycombed, and filling in with earth or other cheap material. Iron scraps, double-headed nails, or skeleton metallic frameworks may also, in certain cases, be imbedded in the structure while it is being formed. Another of Coignet's mixtures was formed by grinding up 10 parts of unslaked lime with 3 to 4 parts of water, and then mixing with 40 to 60 parts of dry sand and two and a half to 10 parts of hydraulic cement; the ingredients are well pounded together and rammed into moulds. In some instances M. Coignet, recommended the addition of a small quantity of super-phosphate or bicarbonate of lime to the water to assist the induration. It is stated on good authority that, by manipulating as M. Coignet directs, a very good quality of concrete can be obtained from an indifferent lime, whereas in ordinary concretes the very best lime obtainable must be used.

To briefly summarise the remaining concrete-like mixtures, we commence with Bousfield's, patented in 1856, and which was composed of from 80 to 85 parts of chalk and from 15 to 20 parts of slaked lime, and just enough water to make the particles cohere; the mixture was then pressed into moulds, and when dry enough removed and exposed to the air.

Ellis's Artificial Stone (1857, pat. 1389) also utilises a mixture of chalk and lime in fine powder, with or without the addition of other stone, burnt clay, or hard material of a suitable nature; the mixture decided on is slightly moistened with water, and submitted to great pressure in moulds.

In 1858 provisional protection only was granted for a mixture of white marble, 2 parts, and lime, 1 part. A few years later another, containing much carbonate of lime, was patented, and was composed of limestone 4 parts, chalk lime 1 part, stone lime 1 part, and sand 4 parts. A material termed "concrete marble" is formed by mixing milk of lime with finely-powdered marble, limestone, or chalk to a pasty consistency, then adding a certain quantity of coarse granular limestone; the mixture hardens quickly, and is fairly durable. Barteau, Corroy, & Guy's artificial stone was formed of any hard material of little value, broken in small pieces and bound together with a cement composed of 20 parts of hydraulic lime, 30 parts of Roman cement, 10 parts of either oxide of iron or iron filings, and 40 parts of rough broken plaster worked up with water to the consistency of mortar. Standfast's improved compositions, patented in 1861, were made up of burnt clay or loam, iron dust, brick rubbish, gravel, hoop iron or wire, lime, cement, vegetable fibre, and sand; the mixture was incorporated with water and run into moulds or hollow frames. Berren's "factitious flagstones" have no particularly novel features, being composed of fragments of hard stones, such as quartz, basalt, &c., bound together with mortar or cement, and allowed to harden in moulds of suitable form.

Bodmer's "stone bricks," used to a considerable extent about twenty-five years ago, were composed of lime and sand, or of lime and powdered slag, or furnace clinkers.

In Messrs. Bodmer's process, patented in 1868, the principal feature of novelty consists in forming a new cement by grinding lime and cement, or both combined, with a certain proportion of slag and stone in a dry state, and subsequently mixing this cementing material with coarse sand, slag, or broken stone, and the necessary amount of water. Adamson & Bird, in their patents, aimed chiefly at the production of smooth surfaced concrete by employing glass, slate, enamelled iron or stoneware to form one or more faces of the mould.

J. McDonald's patent stone, composed of sand, gravel, broken chips and flakes of stone formed into blocks with cement, calls for no special comment.

One of the leading authorities on this subject recommended, some years ago, a concrete composed of 1 part of Portland cement to 7 parts of material consisting of clean Thames gravel, crushed slag and clinkers, crushed bricks, oyster-shells, hard core, &c.; the mixture is to be used with hoop-iron bonds, and the greatest care taken to avoid the presence of loamy matter and dirt in the mixture.

The use of cements containing carbonate of barium ensures, according to Mr. H. Reid, a far better result than is possible with ordinary Portland cement.

A good concrete is made by mixing 100 parts of hydraulic lime, which has fallen to powder, with enough water to form a paste; to this is added 250 parts of gravel and 50 parts of coal ashes; the mass is then thoroughly mixed, and sufficient water added to make it fairly plastic.

Hill patented in 1877 the employment of a mixture of 1 part of Portland cement, 2 parts of lime, and 2 to 4 parts of shingle or sand, with a metallic oxide or pigment if desired.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

13,180, Manufacture of Cement. J. Hargreaves.

By this invention building cement is made from waste materials. Clay or suitable aluminous material is mixed with carbonate of lime,—obtained by passing carbonic acid through alkali waste until the sulphur existing in the waste in the form of sulphide of calcium is eliminated,—by mechanical means, after which it is burnt in the usual way. Coal-mine clay is used, and the heat obtained from the carbon in the waste and clay is utilised. Sand is added where necessary.

13,740, Fireproof Curtains. C. M. Duplany.

By means of this invention a double fireproof curtain is made of woven asbestos sheeting. This consists, as it were, of two curtains, one forming the back and the other the front, with an air-space of about 6 in. between them. The back and front are connected by strips of asbestos-sheeting arranged vertically in pairs from top to bottom at convenient distances apart. The curtain is counterbalanced by weights, and is automatically fastened and released by bolts actuated by springs, but controlled from near the prompter's box by levers, &c.

14,281, Fireplaces. J. B. Petter.

This patent consists principally of a metal plate, with or without tiles, which forms the hearth. This has a narrow grating around and immediately inside the position for the outer edge of the curb or fender, for the admission of air from a chamber underneath, the plate being applied in any way which ensures the distribution of fresh air obtained from outside the apartment. The ashpit and grating is formed in or on the hearth-plate.

14,431, Ventilators. J. W. Gibbs.

By means of this invention, which consists of mica flap or exit ventilators, noise is prevented by forming one or both the surfaces liable to come in contact, of a soft non-inflammable material, which, as it were, cushions the blow and obviates the noise. The flap itself is made of asbestos millboard or card, and fastened by a staple. The ventilator is noiseless, because the asbestos backing is of a soft and yielding nature and butts against a frame lined with similar material.

7,815, Lock Bricks. J. K. Champion.

The bricks, which are the subject of this patent, are made like ordinary bricks, but have a dovetail-shaped opening in one side, whereby one brick is locked to another similar brick placed parallel with it, by means of a cross-brick or tie made to fit into dovetail openings. On the upper part of each brick also is a longitudinal bead, and in the under part a longitudinal groove to fit the bead for the purpose of locking one another. When used as quoins, a return or right-angled bead and groove only is used.

10,580, Hinges. W. P. Thompson (Ducker, New York).

This idea is to produce a hinge of simple construction, such as can be very cheaply made, and easily applied to boxes. It holds its place firmly, and is less likely to work loose than those of ordinary patterns. It consists of wings laid upon or let into the structure, arms at right angles to these, and a pintle which unites the said arms. The hinges may also be fixed with staples, where such is most convenient.

NEW APPLICATIONS FOR PATENTS.

Sept. 14.—13,305, A. Boult, Wood Planing Machine.—13,318, C. Anderson, Burglar-Alarm.

Sept. 15.—13,319, A. Greg, Self-acting Machine for Sawing Timber, &c.—13,321, F. Helps, Imitation of Inlaid Work in Wood or other Material.—13,327, H. Waddington, Draught-preventers for Doors or Windows.—13,344, W. Youlten, Sliding Window Sashes.

Sept. 17.—13,380, J. Pickering and E. Sant, Automatic Gate for Protecting Well-holes of Lifts.—13,386, E. Robbins, Crystal Coagulations, Silicified Concrete or Vitreous Manufacture for Building, *i.e.*, Primary Lights.—13,393, R. Hocking, Self-flushing Apparatus for Sewers, Drains, &c.—13,430, C. Merchant, Cowls for Ventilators and Chimneys.

Sept. 18.—13,448, A Caldwell, Controlling or Regulating the Flow of Water into Houses, &c.—13,478, J. Wilson and L. Constantine, Veneers.

Sept 19.—13,505, T. White and J. Beal, Gas-pipe Hooks.—13,509, J. Shanks, Siphonal Cisterns for Water-closets, &c.—13,517, E. Smith, Catch for Locks and Latches.—13,525, W. Ralston, Wall-papers.—13,526, J. Twichin, Convertible Window-sashes.—13,536, W. Howcroft, Paint Brushes.—13,540, S. Williams, Burners for Heating Lime-kilns, Brick-kilns, &c.

Sept. 20.—13,561, J. Gamlin, Chimney-pieces.—13,562, J. Hartford, Sewer-pipes. — 13,585, J. Coulter, Building Block or Brick.

PROVISIONAL SPECIFICATIONS ACCEPTED.

16,061, R. Reeves, Construction and Ventilation of Soil-pipes, House Drains, &c.—10,409, S. Williams, Bolts for Doors, &c.—11,248, E. Darley, Panic Bolt for the Doors of Theatres, &c.—11,249, W. Ross, jun., Siphon Drain-pipes and Connexions.—11,306, W. Howard, Window-fastenings.—11,460, C. Priestley and S. Gurney, Wood Block-flooring.—11,462, B. Cassidy, Corrugated Sheet Metal Roofs.—11,473, J. Davies, Brick-kilns, &c.—11,536, W. Verity, Operating Window-sashes.—11,587, A. Hardy, Alarm Bells for Doors, &c.—11,759, T. Bates, Flap Ventilators.—11,805, G. Salter and F. Baker, Sash-fasteners.—12,287, H. Green and A. Sterkman, Stoves.—12,541, J. Cook, Water-closet Apparatus.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

14,554, R. Lee, Fireproof Building Materials, &c.—14,716, A. Hopkins, Fastening and Securing Wood Block, Flooring, &c.—15,969, B. Healey, Outlet Valves for Sewer-flushing, Tanks, &c.—15,981, J. Earsdon, Double-flush Water-waste preventing Valves.—16,042, R. Peel, Top Bars for the Ribs of Fire-places.—16,093, J. Stevens and C. Major, Hydraulic Lifts.—372, W. Gibbs, Glazing.—7,669, H. Miller, Attaching Sash-lines to Window-sashes.—10,146, F. Henninger and J. Fyfer, Sash-fasteners.—11,271, C. Kinnell and G. Rothnie, Balancing and Opening Sashes, &c.—11,762. E. Emanuel, Man-hole Cover for Sewers and Drains.—11,909, J. Stephens and R. Clark, Portland Cement.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

SEPT. 17.

By SIMMONS & SON.

Oxon, Shiplake—"Shiplake Court Farm," and 362a. 2r. 24p., freehold £13,000

By T. WOODS.

Isleworth—"Grove House," with grounds, freehold 1,050

By Messrs. CRONK.

Lewisham—Three freehold cottages in Blackshaw-alley 305

Ightham, Kent—Freehold house, cottages and freehold land, 8 acres 3,000

By E. E. CROUCHER & Co.

Willesden—13, Percy Villas, 88 years, ground-rent £5 125

By RANDALL, BEARD, & BAKER.

Finchley, Leicester-road—"Rushton Villa," freehold 355

Park Hall-road—Ten houses, 95 years, ground-rent £62. 10s. 3,350

SEPT. 18.

By A. SPAIN & SON.

Poplar—1 to 4, Sophia-street; and 1, 2, and 3, Elizabeth-terrace, 78 years, ground-rent £65 ... 40

SEPT. 19.

By Mr. LUCKHURST.

Brixton—14, Sudbourne-road, 78 years, ground-rent £7. 7s. 325

SEPT. 20.

By NEWBON & HARDING.

Barnsbury-road—No 161, term 23 years, ground-rent £50 105

Regent's Park—1, Cumberland-terrace, ground-rent of £42. 10s., term 37 years 710

Clerkenwell—2 and 3, Arlington-street, 23 years, ground-rent £16 545

Islington—65, Essex-road, copyhold 630

Holloway—40, 42, and 49, Grafton-street, 19 years, ground-rent £18. 18s. 525

Holloway-road—Nos. 654 and 656, freehold 1,135

Finchley—2, Grove-villas, freehold 400

By F. J. BISLEY.

Rotherhithe—1 and 2, St. Paul's-lane, freehold 300

97, 99, and 101, Galleywall-road, 36 years, ground-rent £15 570

Bermondsey—116, Southwark Park-road, 49 years, ground-rent £5. 17s. 410

MEETINGS.

MONDAY, OCTOBER 1.

Society of Engineers. — Mr. W. Lawford on "Light Railways." 7.30 p.m.

Clerks of Works' Association (Carpenters' Hall).—Paper by Mr. E. Moore. 8 p.m.

TUESDAY, OCTOBER 2.

Glasgow Architectural Association.—(1) Mr. A. W. Beaton on "Wrought Iron-Work." (2) Mr. Larmont on "Church Organs."

WEDNESDAY, OCTOBER 3.

Builders' Foremen and Clerks of Works' Institution.—8.30 p.m.

THURSDAY, OCTOBER 4.

Glasgow Architectural Association.—Visit to the Forth Bridge.

FRIDAY, OCTOBER 5.

Architectural Association.—Opening *conversazione* of the session, to be held at the Westminster Town Hall. 8 p.m.

The present value of Building Sites in Brixton.—The great increase in the value of building sites in Brixton has just been shown by the sale of a freehold piece of land having a frontage of 38 ft. and a depth of 123 ft. The land, which is on the south side of Brixton-road, opposite the Bon Marché establishment, was sold about thirty years since, to the then minister of Stockwell Independent Chapel, for his private residence, at the sum of 500*l*. Within the last few days it has again been sold, the sum realised for it being 3,650*l*. The purchaser is a well-known Brixton builder, who has also bought the adjoining property from the London, Chatham, and Dover Railway Company, with the view of erecting a public hall and some other buildings on the site.

Miscellanea.

Opening of a New Town Hall, Elland, Yorkshire.—Last week a new Town Hall was opened at Elland by Sir J. Savile. The front of the main building is broken with stone pilasters, and there is a balcony over the doorway; while from the roof rises a bell-tower. The main entrance is reached by a flight of steps, which are flanked by stonework, and the staircase leading to the large hall is protected by a banister of pitch-pine, with mahogany rail. There is sitting accommodation in the area of the hall for 810 persons, and in the gallery for 240. The hall is lofty and well lighted, and is ventilated by inlet shafts, which are inserted well up on the side walls, and outlet ventilators placed in the roof. The artificial lighting is by means of coronæ, with additional brackets for the sides of the room. On the same floor as the large hall a committee-room and ante-rooms have been provided. The hall forms part of a block, comprising also eleven shops, and will cost 7,000*l*. The architect was Mr. C. F. L. Horsfall, of Halifax.

The Thames Tunnel.—A crowded meeting was held in the Town Hall, Poplar, on Monday evening, for the purpose of urging the Metropolitan Board of Works to proceed without delay with the construction of the Thames (Blackwall) Tunnel for vehicular traffic. Mr. Henry Green occupied the chair. Mr. Isaacson, M.P., moved: "That this meeting desires to urge upon the Metropolitan Board of Works the importance of at once proceeding with the construction of the Thames (Blackwall) Tunnel for vehicular traffic." It had been objected that the construction of the approaches to the mouth of the tunnel would involve the demolition of a large number of artisans' dwellings, but there was plenty of room in the neighbourhood to accommodate any number of persons who might be displaced by the improvement. Major Welby seconded the motion, which was carried unanimously. It was further decided to appoint a deputation to wait upon the Metropolitan Board of Works, and, if considered necessary, upon the Home Secretary.

Holywell Water Supply.—An important meeting was held at the Holywell Assembly Hall, last week, when the claims were advanced of the new scheme for supplying with water the large and populous district embraced in Holywell, Greenfield, and Bagillt. A company has been formed with a capital of 20,000*l*. to carry out the scheme, and assistance has been promised by the Duke of Westminster and others. The source of the supply is Milwr, about a mile and a-half from Holywell, and the water, after passing through filtering beds, will be stored in two large reservoirs. The engineer of the scheme is Mr. H. E. Taylor, C.E., of Chester. The Mayor of Chester presided over the meeting, and Mr. C. E. Matthews, of Birmingham, strongly urged the inhabitants to support the scheme. A resolution approving of the scheme was passed by the meeting.

The English Iron Trade.—With a continued activity in trade, the English iron market keeps very firm, with an upward tendency, on the whole. Pig-iron has been somewhat quieter, without, however, any material giving way in price. Middlesbrough is about 3d. a ton lower, but elsewhere the movement is still the other way. The Glasgow warrant market has been agitated by constant fluctuations, and the end of the week finds warrants somewhat lower. Manufactured iron, for which there continues an active demand, is still rising, and, although no actual advances have been made, they are spoken of as not being far off, while for prompt delivery an additional 2s. 6d. per ton on quoted prices has to be paid where such orders can be placed. Tin plates are in a rising mood. Steel is quite as active this week as last, with values firmly held at the high rates ruling. Shipbuilders continue to add to their order-books, notwithstanding the higher prices asked for tonnage. The condition of the engineering trades remains very satisfactory.—*Iron.*

Belfast. — The Water Commissioners of Belfast have in consideration a scheme for a wholesale filtration of the water supplied to the town of Belfast, with a provision for storage of the filtered supply.

St. Paul's, Heaton Moor.—A double stained glass window was placed last week in St. Paul's Church, Heaton Moor. The subject is Ruth gleaning in the fields of Boaz. The window has been supplied by Messrs. Edmondson & Son, of Manchester.

Leith Drainage.—We learn from the *Scotsman* that last week a special meeting of the Leith Town Council was held to consider a report from the special Parliamentary Committee, which recommended the approval of the drainage scheme adopted by the joint committee of the Corporations of Edinburgh and Leith, and asked for powers to promote a Bill in Parliament for giving effect to the same in co-operation with Edinburgh. The committee sought powers to deal with the pollution of the Water of Leith above Coltbridge, and should it be found necessary, stringent provisions would be inserted in the Bill to prohibit the discharge of all refuse, filth, sewage, and other polluting matter into the Water of Leith above Coltbridge. They also recommended that the nine drainage districts into which the burgh of Leith was at present divided should be re-united and assessment levied over the whole burgh as soon as practicable. Bailie Archibald said it was inconceivable that after Edinburgh and Leith twenty-four years ago had spent about 60,000*l.*, and were now prepared to spend between 60,000*l.* and 70,000*l.* more to carry away all their sewage and contamination, that Parliament should allow the parties above Coltbridge to continue to make the Water of Leith a common sewer, to the danger of the health and lives of the citizens of both towns. Should the parties above Coltbridge, who were interested and responsible for the pollution of the river, desire to come to terms with the Corporations, speaking for himself he would say that he believed they would be admitted on fair and even liberal terms, and it would be better to spend some money in removing the sewage and other refuse at present allowed to flow into the Water of Leith above Coltbridge, than to spend it in the Courts of Law. The motion that the report be adopted was carried, and the amendment that the Bill should deal with the pollution above Coltbridge was therefore shelved. If the position of matters is correctly stated, however, there is no doubt that this source of pollution must eventually be dealt with, and why not make one matter of it?

New Pier for Southend.—The Southend Local Board, at their meeting last week, sealed a contract with Messrs. Arrol Bros., of Glasgow, for the construction of a new pier, to take the place of the present unsightly one, which has become inadequate to the requirements of the place, and which is considered to be not very safe. The total cost of the whole scheme is estimated to be about 60,000*l.* but the amount of the present contract is a little over 43,000*l.* The contract is divided into three distinct sections, the first of which will consist of a double-decked pier of about 200 yards in length, extending from the present massive pier approach up to and including a concert-room, which is estimated to cost 2,000*l.* Seating accommodation will be provided for 1,000 people. The second section consists of a combined promenade and tramway pier about a mile in length, viz., from the concert-room to the head of the present pier. This portion of the structure will be 20 ft. wide, 12 ft. being reserved for promenading purposes, and the remainder for the tramway. The third section consists of a large pier-head, which will be erected just outside the present one. Three extensive landing-stages suitable to the different sets of the tide are to be provided at the pier-head, and there will also be refreshment and waiting rooms, and other conveniences situated on the pier. The engineers are Messrs. Brunlees & M'Kerrow, of London, under whose supervision the work will be carried out.

New Bridge over the Medway.—On Wednesday of last week a new bridge over the Medway at Tunbridge was formally opened. The bridge spans the Medway at a point where it crosses the High-street, Tunbridge, on the main road from London to Hastings. It is of stone, and is 36 ft. 3 in. wide, hog-backed in shape. It is formed of two piers and buttresses, and has cost upwards of 3,000*l.* The architect was Mr. Ruck, of Maidstone, and the contract for the builder's work was let to Messrs. Wallis & Clements, of Maidstone; and the iron-work was executed by Mr. Gray.

New Catholic Schools at Seaham Harbour.—On Monday last the new schools in connexion with the Roman Catholic Church of St. Mary Magdalene, at Seaham Harbour, were opened for teaching. The architect was Mr. J. C. Parsons, of Newcastle-on-Tyne, and the contractor was Mr. E. Weatherley, also of Newcastle. The cost has been about 1,200*l.*

New Hospital for Newcastle.—A new hospital for sick children, which has been erected at the Moor Edge, Newcastle, by the generosity of Mr. John Fleming, was formally opened on Thursday by Lord Armstrong. The building is in the "Domestic English" style of architecture of the 16th century, and is built of red Normanby brick, with smooth stone dressings from the Brunton and Wideopen Quarries. Access is gained to the entrance hall through the principal doorway, which consists of carved stone, and has a semi-circular head with fluted pilasters. The wall frame and pilasters of the hall are of oak, and the ceiling is panelled with ornamental moulding and arches. The floor is of specular marble. At the right of the entrance-hall an oak door leads to the Board Room, the dado of which is oak, and the walls above are covered with lincrusta. The panelled ceiling is supported by square pillars with ornamental sides and capitals, and with oaken bases, and the flooring is of oak blocks. On the main corridor the matron's administrative department is situated, and from this corridor a door opens into the play-ground. The corridor to the left of the entrance-hall contains the medical officer's department, and the ceiling is panelled and supported by pilasters, while the floor is of marble. At the entrance end of the north wing are the medical officer's bed-room and sitting-room, and on the ground-floor the dining-hall, which is 38 ft. long, 20 ft. wide, and 18 ft. high. The floor of this hall is of oak blocks, ornamental pilasters support the cornice, with clearstory windows over, and a panelled ceiling. Adams's patent ventilators are used, and the heating is by steam coils. There is accommodation in the hall for 130 children. Separate from the main building the wash-house, laundry, &c., have been provided, and adjacent to the laundry is a boiler-house. From the entrance-hall, a marble stairway leads to the upper portion of the building. The balusters are in cast-iron panels, with newel posts and ornamental lamps. The stairs are lighted by a large wrought-iron circular dome light, with a ventilator in the centre. On the first floor is the day room, which is ventilated by two inlet ventilators and one outlet. To the right and left of the day-room are the wards, the arrangement in each wing being similar. Next to the day-room is a small ward, and on the other side of the corridor is the ward scullery. Nurses' rooms, in electrical communication with the departments of the matron and the medical officer, are arranged on this floor, and also the general ward, which is 60 ft. long and 20 ft. wide. There are five double windows on each side. The floor is of pitch pine, and from two sides door-windows open on to small balconies. A little higher up the stairs is the surgical ward, and the top floor is devoted to the use of the nurses resident in the institution. The total number of children's cots in the hospital is sixty-three. The total cost of the new hospital has been 23,000*l.* The architects were Messrs. J. S. Quilter & G. Wheelhouse, and the contractors were Messrs. J. & W. Lowry, all of Newcastle.

The Surveyors' Institution.—A large and representative gathering of the Fellows of The Surveyors' Institution resident in the counties of Lancashire and Cheshire was held in the meeting-room of the Manchester Society of Accountants last week. The object of the meeting was the formation of a Provincial Committee of the Institution for the two counties above referred to, on the basis of the scheme for the local organisation of members throughout the provinces which is in course of gradual development by the Council. The Secretary of the Institution, who was present at the invitation of the Provisional Chairman, explained in detail the constitution of the new committees and the objects the Council have in view in their formation. Mr. John Cross, of 77, King-street, Manchester, to whose hands the preliminary arrangements were confided by the Council, was unanimously elected Chairman of the Committee for the ensuing year. In the exercise of the discretion vested in the meeting by the rules of procedure, it was resolved that the Committee be designated the Provisional Committee of the Surveyors' Institution for the Counties Palatine of Lancashire and Cheshire. After the completion of the formal business of the meeting the Committee proceeded to consider the arrangements for the preliminary examination for the admission of students to the Institution, to be held at Manchester, under the auspices of the committee, on January 22 and 23 next, Messrs. J. Holden, T. Silk Wilson, E. J. Bridgford, and T. A. Dickson being appointed moderators for the purpose.

Reredos, St. Mary's, Lambeth.—This reredos, presented to the church by Sir Henry Doulton, was announced to be "dedicated" on Friday of this week. It has been executed at the works of Messrs. Doulton, Lambeth, from the designs of Mr. J. Oldrid Scott. With the exception of four columns which are in Salt Glazed Doulton-ware, the whole of the reredos is in a fine terra cotta of warm buff tint. It consists of a central portion 8 ft. 6 in. wide, containing three arched bays; the centre opening is filled with a representation of the Crucifixion, and the arches on either side are subdivided, and each contains two sculptured figures. Slightly recessed from the central portion there are wings 3 ft. wide on either hand, making the total width of the reredos about 14 ft. 6 in. Up to a height of 5 ft. the design is quite plain: the portion next above contains the sculptured panels set within arches with traceried heads. The central portion is terminated with a projecting cornice with ribbed cove below, and open cresting and pinnacles above; the highest pinnacles will support statuettes of angels. The height to the top of the cresting is 11 ft. 9 in., and to the top of the statuettes about 15 ft. The weight of the whole reredos is carried clear of the floor by means of a concealed girder. The sculptures have been designed and modelled by Mr. George Tinworth. The central panel (4 ft. 9 in. high, 2 ft. 9 in. wide) contains a representation of the Crucifixion. In the four smaller panels are single figures of the Patriarch Moses, the Apostles Peter and Paul, and the Prophet Elijah. Inserted in quatrefoil panels in the wings of the reredos are four portrait medallions of archbishops:—Hubert Walter or Fitzwalter, Archbishop from 1193 to 1207, Lord High Chancellor in the reign of Richard I.; Richard Bancroft, Archbishop from 1604 to 1610; Thomas Tenison, 1695 to 1716; and Thomas Secker, Archbishop from 1758 to 1768, buried in the churchyard of Lambeth. Secker bequeathed the whole of his library to the palace. The medallions of Bancroft, Tenison, and Secker have been modelled from photographs taken from the original portraits in Lambeth Palace; that of Tenison was painted by Simon Dubois, and that of Secker by Sir Joshua Reynolds.

The Oakfield Estate at Ashtead.—Sale of Building Sites.—A large area of land, forming a portion of the Oakfield Estate at Ashtead, in Surrey, and covering upwards of fifty acres in extent, has just been laid out for building upon. Between 250 and 300 houses and shops are intended to be erected on the estate, all of them being of a high class, no house of a less prime cost value than £400 to be erected on any of the plots, whilst as regards several of the plots, the minimum value is £600. A number of new roads, 50 ft. wide, have been formed on the estate, three of them being nearly half-a-mile in length each. The first portion of the estate, containing seventy-four plots, was offered for sale last week, by Messrs. Baker & Sons, the sale taking place in a marquee on the estate, when a numerous company was present. Most of the plots submitted have frontages of 25 ft. and depths of from 180 ft. to 200 ft., whilst some of them are much larger, having frontages of 60 ft. each. On these last-named plots detached villas only are to be erected, having forecourts of 30 ft. in depth from the main roads. The auctioneer, in offering the property, drew attention to its attractive character, pointing out that Ashtead was becoming an increasingly residential suburb, being reached in forty minutes from London, and that the estate bordered upon the Ashtead and Leatherhead Commons, upwards of 1,000 acres in extent, known as being amongst the most picturesque in England. Amongst those present were several speculators and builders, and the biddings for the different plots was very active. Most of the sites submitted were sold, the prices realised varying from 30*l.* and 40*l.* up to about 100*l.* for the larger plots. The proceeds of the sale amounted to upwards of 1,980*l.*

New Clock for Mysore.—The Maharajah of Mysore has ordered a large clock, with two illuminated dials, to chime the Cambridge quarters, on bells of about one ton. The bell-framing to be supplied is of teak, the clock of the best gun-metal, with compensated pendulum of zinc and iron tubes. The maker is Mr. J. W. Benson, of London.

Roman Catholic College, Tooting.—We are asked to mention that the locks and door-fittings for this building, described in our columns last week, were supplied by Mr. James Hill.

New Hospitals for Liverpool. — On Saturday last, two new hospitals for infectious diseases, erected by the Corporation of Liverpool in Netherfield-road and Grafton-street, were formally opened by the Mayor of Liverpool. The Netherfield-road institution has been constructed out of a formerly existing building which was used as a private charity hospital and which consisted of a small administrative block and two pavilions. In the new hospital nothing but the outside walls of the old building has been left, and in reconstructing the pavilions four new wards have been provided in each, in addition to four private wards in one and two in the other, and altogether the building is capable of accommodating between eighty and ninety patients. Access to the upper wards is obtained by the outside staircase, thus effecting a complete separation from the wards beneath, and affording a means of treating male and female patients for four distinct diseases. Complete accommodation has also been provided for the matron, medical officer, nurses, and servants. The sanitary arrangements and means of ventilation have had careful attention, and steam laundry and disinfecting-rooms have been erected at the rear of the main building. The architect was Mr. H. Shelmerdine, of Liverpool; and the contractors were Messrs. Morrison & Sons, also of Liverpool. The Grafton-street hospital is planned on the pavilion system, and has accommodation for seventy patients in eleven distinct wards. Each block is thoroughly disconnected, and the system of cross-ventilation has been adopted, while the greatest possible isolation of each ward and department of the building, consistent with economical and efficient administration, has been arranged. Three special wards are reserved for receiving and isolating doubtful cases. Two complete and distinct steam laundries, one for the patients' and the other for officials' clothing, &c., form part of the scheme; and a powerful high-pressure steam apparatus is provided for rapidly disinfecting bedding and tainted clothing. The administrative buildings are complete in every detail; the drainage and other sanitary details have been carried out with care. The architects were Messrs. Simpson & Allen, London, and the contractors Messrs. Holme & Green, Liverpool. The two new buildings are capable of accommodating about 160 patients, and the total cost, exclusive of the Grafton-street site, is abcut 27,000*l.*

Street Paving.—We take the following statement of experience as to various pavings from the annual report of Mr. Lovegrove, the Surveyor to the Board of Works of the Hackney District: — "The extra cost of maintaining wood-paving, as compared with granite, is to a considerable extent met by the reduced first cost, while wood has the great compensating advantage of being so much less noisy than either granite paving or macadam. Granite 4 in. by 4 in. cubes would be far cheaper than macadam, and the following dates of laying show the endurance of this material:—

Mare-street, north of St. Thomas's-square, laid in 1873.
Clapton-road, laid in 1873, relaid last year.
Upper Clapton, laid in 1873, relaid last year.

Granite paved roads have, however, the drawbacks of being noisy and slippery. As to relative costs, the following figures may serve as an index:—

	Per yd. supl. s.	d.
6 × 4 in. Guernsey granite pitchings laid on 6 in.		
Portland cement concrete	15	0
4 × 4 in. ditto ditto	11	0
Wood paving as already laid in the district	7	9
Broken granite—average thickness, 3 in., including labour and rolling	1	6

The macadam requires renewal in from one to six years according to the traffic, and the extra cost of clearing the mud and dust is considerable. The broken granite margins alongside the tramways are very costly to maintain. The repairs now carried on with the 2½ in. broken irregular stones under the steam roller, quickly work away from the tramway paving, and the constant feeding involves an outlay which, in a few years, far exceeds the cost of proper paving. In the course of ten years the cost per yard super of such repairs cannot be less than ten shillings, and is frequently much more."

Memorial Window, Lyme Regis.—A new painted north-east window has just been placed in the parish church of Lyme Regis, in memory of the late vicar, the Rev. G. H. P. Barlow. The work has been executed by Messrs. Bell & Beckham, of London.

The late Anglo-Danish Exhibition.—A two days' sale last week of the fittings and appointments of the recent Anglo-Danish Exhibition brought a numerous company to South Kensington. The catalogue contained 440 lots, and included the whole of the furniture, draperies, and decorations which had been utilised for the exhibition; but the most interesting portions of the property submitted were the erection of the theatre to seat 1,000 persons; the Danish village, in eleven lots, containing Danish houses, cottages, and a village inn; also the Danish grotto; the switchback railway and Alpine scenery; the Doulton panels; several iron buildings, rustic bridges and summer-houses, which had been erected in different portions of the grounds for the purposes of the exhibition; together with a representation in stone of "Hamlet's Grave." Several terra-cotta vases were likewise included in the sale. Amongst the prices realised was 540*l.* for the theatre, built by Mr. Humphreys, of the Albert Gate Works, constructed of timber frame-work, and covered with corrugated iron. The dimensions of the building are 155 ft. long by 45 ft. wide, with numerous additions, consisting of fourteen side boxes, dressing-rooms, and offices. It was stated to be well adapted for a volunteer drill-hall, lecture-hall, or public institution. The scenery and tableaux connected with the theatre were sold for 26*l.* The terra-cotta vases, eighteen in number, realised an aggregate sum of upwards of 50*l.* After a few bids had been made for the cottages forming the Danish village, the auctioneer announced that the whole of them were withdrawn. The Danish grotto was described as 96 ft. long and 18 ft. wide, the exterior painted and moulded to represent rockwork, and the interior arranged for an exhibition of paintings. The auctioneer in submitting this portion of the property, said it had cost upwards of 250*l.*, and that he had a reserve of 50*l.* upon it. As the biddings were only nominal, it was withdrawn. The switchback railway was described as 440 ft. long, 22 ft. wide at the station, and 14 ft. wide at the extremity, with double tracks. Four cars, by the Ashbury Carriage Works Company, were included in the sale. The auctioneer announced that the railway was erected this year for the purposes of the exhibition, at a cost of more than 400*l.*, but the highest sum offered was 115*l.*, at which it was sold. The painted Arctic scenery forming the background of the railway, with the framing and supports, was sold for 20*l.* The sale concluded by the offer of the Doulton panels at the main entrance-hall. They were described as faced with slabs of terra-cotta, painted in the impasto process recently introduced by Doulton & Co. Two large panels on either side, each 16 ft. high by 7 ft. 6 in. wide, were said to be probably the largest paintings ever yet executed in ceramic ware. The highest offer was 85*l.*, at which they were withdrawn. There was no offer for "Hamlet's Grave." The total proceeds amounted to upwards of 2,800*l.* Messrs. Baker & Sons conducted the sale.

Dangers of "Rising" Health Resorts.—People little reck of the dangers which they run in exchanging their own comfortable, well-ordered house for stuffy seaside lodgings, where imperative economy requires that no more rooms shall be hired than are necessary. The sink and water-closet arrangements at all "rising" health resorts will be found almost uniformly bad. In the old days, when only a few stray visitors came, the sewage went into cess-pools, and the water supply was obtained from wells. Now, all the houses boast their water-closets, connected in more or less unscientific fashion with drains laid down in the streets, and converging to a sewer discharging into the sea. The drains are usually put down piecemeal, and the levels are not right. The water supply is intermittent, and, as a consequence, closet-pans get dry, and sewer-gas pours up into the houses. Add to this the fact that the place has no building bye-laws, and that any one may and does erect new houses in his own fashion, and at any angle that he chooses to existing roads, and the dangers in the case of infectious disease getting a foothold in the place will at once be manifest.—*Sanitary Record.*

Sewage Scheme for Preston.—The Town Council of Preston intend, at their next meeting, to propose that the Council memorialise the Local Government Board for power to borrow a sum of 130,000*l.* for the purpose of carrying out a sewage scheme by which the sewage of the town will be taken down to a farm at Freckleton, about three miles away.

New Free Harbour and Depots at Copenhagen.—The Danish Ministry of Finance is inviting designs for the new free harbour and depôts to be established in Copenhagen. The ground has been chosen for it. Either the depôts are to be arranged in one large building, or a number of small ones, but none of the latter must be above three storeys, including vaults. The whole is to embrace 15,000 square mètres for storage, and, besides, offer accommodation for offices. Of the designs received for the harbour, the six best will be paid for, two with 165*l.*, and the rest with 110*l.*, whilst five of the best for the free depôts will be remunerated at the rate of 55*l.* each. All the designs should be in the hands of the Danish Ministry of Finance by Nov. 1.

PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Teak, E.I. ..... load	8	0	0	12	10	0
Sequoia, U.S. ..... foot cube	0	2	3	0	3	0
Birch, Canada ..... load	2	15	0	4	15	0
Fir, Dantsic, &c.	2	0	0	4	0	0
Oak ,, ...	2	0	0	4	10	0
Canada	4	0	0	6	10	0
Pine, Canada red	2	10	0	3	10	0
,, yellow	2	10	0	4	0	0
Lath, Dantsic ..... fathom	3	10	0	5	0	0
St. Petersburg	5	0	0	6	0	0
Wainscot, Odessa, crown	2	10	0	3	0	0
Deals, Finland, 2nd and 1st...std.	9	0	0	10	0	0
,, 4th and 3rd	7	0	0	9	0	0
Riga	7	0	0	8	0	0
St. Petersburg, 1st yellow	9	10	0	15	10	0
,, 2nd ,, ...	9	0	0	10	0	0
,, white	7	10	0	10	10	0
Swedish	7	10	0	16	10	0
White Sea	8	10	0	17	10	0
Canada, Pine, 1st	16	0	0	25	10	0
,, ,, 2nd	10	10	0	17	10	0
,, ,, 3rd, &c.	7	10	0	10	10	0
,, Spruce, 1st	9	0	0	10	0	0
,, 3rd and 2nd	7	0	0	8	10	0
New Brunswick, &c.	6	10	0	8	0	0
Battens, all kinds	5	10	0	12	0	0
Flooring Boards, sq., 1 in., prepared, First	0	11	0	0	14	6
Second	0	8	0	0	10	9
Other qualities	0	5	6	0	7	9
Cedar, Cuba ..... foot	0	0	3½	0	0	3¾
Honduras, &c.	0	0	3½	0	0	3¾
Australian	0	0	2	0	0	3
Mahogany, Cuba	0	0	4½	0	0	5½
St. Domingo, cargo average	0	0	4½	0	0	5¾
Mexican ,, ...	0	0	4	0	0	4½
Tobasco ,, ...	0	0	4½	0	0	5¾
Honduras ,, ...	0	0	4½	0	0	5¾
Box, Turkey ..... ton	5	0	0	12	0	0
Walnut, Italian ..... foot	0	0	4½	0	0	6
METALS.						
IRON—Bar, Welsh, in London...ton	4	17	6	5	0	0
,, ,, at works in Wales ...	4	7	6	4	10	0
,, Staffordshire, in London ...	5	5	0	6	15	0
COPPER—						
British, cake and ingot..... ton	78	10	0	80	0	0
Best selected	79	10	0	81	0	0
Sheets, strong	85	0	0	0	0	0
Chili, bars	100	0	0	101	0	0
LEAD—						
Pig, Spanish ..... ton	14	5	0	14	7	6
English, common brands	14	7	6	14	10	0
Sheet, English	15	10	0	15	12	6
SPELTER—						
Silesian, special ..... ton	19	0	0	19	2	6
Ordinary brands	18	17	6	19	0	0
TIN—						
Banca ..... ton	103	0	0	0	0	0
Billiton	102	0	0	0	0	0
Straits	104	0	0	0	0	0
Australian	104	0	0	0	0	0
English Ingots	107	10	0	0	0	0
ZINC— English sheet ..... ton	22	0	0	23	0	0
OILS.						
Linseed ..... ton	19	7	6	19	10	0
Cocoanut, Cochin	26	0	0	28	0	0
Ceylon	25	0	0	0	0	0
Palm, Lagos	23	0	0	0	0	0
Rapeseed, English pale	28	10	0	0	0	0
,, brown	27	0	0	27	5	0
Cottonseed, refined	21	15	0	22	0	0
Tallow and Oleine	25	0	0	45	0	0
Lubricating, U.S.	4	0	0	6	0	0
,, refined	7	0	0	12	0	0
TURPENTINE—						
American, in casks ..... cwt.	1	11	0	0	0	0
TAR—						
Stockholm ..... barrel	0	16	0	0	16	6
Archangel	0	10	0	0	10	6

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *Noon on Thursdays.*]

BAYSWATER.—For alterations and shop fittings at No. 80 Queen's-road, W., for Mr. E. P. Joyce. Mr. William A. Burr, architect, 65, Chancery-lane, W. C.

Bray & Pope	£329 0 0
Young & Co.	299 0 0
Larke & Son	296 0 0
Stevens Bros (accepted)	257 10 0

CHELSEA.—For steam heating apparatus, for heating the wards of the Chelsea Infirmary, Cale-street, Chelsea, for the Guardians. Messrs. A. & C. Harston, architects, 15, Leadenhall-street, E.C. No quantities:—

Clements, Jeakes, & Co.	£1,055 0 0
R. Crane	988 0 0
Bradford & Co.	981 0 0
J. & F. May	891 10 0
Benham & Son	882 0 0
Summerscales & Son	877 0 0
Potter & Sons, South Molton-st., W.*	862 0 0

* Accepted.

CONTRACTS AND PUBLIC APPOINTMENT.

Epitome of Advertisements in this Number.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Stone for Macadamising	Hull Corporation	A. E. White	Oct. 4th	ii.
Sea-Wall and Esplanade	Sandown Local Board	J. Newman	do.	ii.
Houses with Outbuildings, Seaton Sluice	Admiralty	*Official*	Oct. 5th	ii.
Broken Guernsey Granite	Willesden Local Board	O. Claude Robson	Oct. 9th	ix.
Coals and Coke, Drain Pipes and Stores	Croydon Corporation	*Official*	do.	ix.
Stables and other Buildings	St Mary's (Battersea) Vestry	J. T. Pilditch	do.	ii.
Making-up and Paving Road	Wandsworth Bd. of Wk	*Official*	do.	x.
Well-Sinking, &c.	Cheshunt Local Board	T. Bennett	do.	ix.
Engines and Pumps	do.	do.	do.	ix.
Cast-Iron Water Mains	do.	do.	do.	ix.
Shops and Houses, Southend	W. Lloyd Wise, Esq.	E. Wright	do.	ix.
Making-up Road	S. Hornsey Local Board	E. Fry	Oct. 10th	x.
Drainage Works	Ecclesall Bierlow R.S.A.	T. G. Edwards	do.	ii.
Paving, &c., Works	Hammersmith Vestry	H. Mair	do.	ix.
Alteration, &c., to Town-hall	Horsham Local Board	J. Percy Gates	Oct. 11th	ii.
Clothes' Store, Tool House, &c.	Fulham Union	*Official*	do.	ix.
Making-up Roads	Walthamstow Local Bd.	do.	Oct. 12th	x.
Fire Brigade Station, Marylebone	Met. Board of Works	do.	Oct. 15th	ix.
New Shops, &c.	Berkhampstead Co-operative Society	J. F. Goodey	Oct. 17th	ii.
Painting, &c., Repairs to Houses, Hampstead			Not stated	ix.
New Barracks, Great Grimsby	Salvation Army	E. J. Sherwood	do.	ii.

PUBLIC APPOINTMENT.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Clerk of Works	Bath U. S. A.	2*l.* 2s. per week	Oct. 8th	ii.

CROYDON.—For class-room and additional cloak-rooms and lavatories to the junior department of the Beulah-road Schools for the Croydon School Board. Mr. Robert Ridge, Surveyor to the Board, architect. Quantities by the architect:—

Monckton	£707 0 0
Bryan	580 0 0
Coleby & Co.	575 0 0
Jones	550 0 0
Henley & Co.	540 0 0
Batley & Linfoot	538 15 1
Pearson & Co.	538 0 0
Docking	531 0 0
J. & C. Bowyer	519 0 0
Mid-Kent Building and Contracting Works	490 10 0
Ockenden	497 0 0
Pearce	490 0 0
Smith & Sons	465 0 0
Hole	459 0 0
Verrall	455 0 0
Knight & Bennett	450 0 0
Caplen & Redgrave	447 4 0
Winburn (accepted)	435 0 0

CROYDON.—For additional cloak-rooms and lavatories to the girls' and infants' departments of the South Norwood Schools, for the Croydon School Board. Mr. Robert Ridge, Surveyor to the Board, architect. Quantities by the architect:—

Monckton	£430 0 0 !
Henley & Co.	391 0 0
Bryan	369 0 0
Docking	358 0 0
Jones	354 0 0
Pearson & Co.	350 0 0
Batley & Linfoot	323 19 8
Ockenden	321 0 0
J. & C. Bowyer	311 0 0
Verrall	305 0 0
Winburn	295 0 0
Smith & Sons	287 0 0
Caplen & Redgrave	286 0 0
Pearce	279 0 0
Mid-Kent Building and Contracting Works	277 10 0
Hole (accepted)	240 0 0 !

HERTFORD.—For the construction of new flood-gates and overflow weir on the River Beane, for the Corporation of Hertford. Mr. Russell Austin, engineer, Hertford:—

William Gray, Hertford	£531 12 0
George Bell, Tottenham	505 11 0
John Cook, Spalding (accepted)	481 0 0

HERTFORD.—For the construction of about 700 yards 9-in. outfall sewer, together with manholes, tanks, and the preparation of land for sewage disposal at Little Amwell, for the Hertford Rural Sanitary Authority. Mr. Russell Austin, engineer, Hertford:—

John Cook, Spalding	£741 0 0
George Bell, Tottenham	634 0 0
G. R. Rackham & Co., Colchester	593 0 0
Thomas Adams, 22, Canal-road, Kingsland (accepted)	583 0 0

GORE FARM (Kent).—For engineering work in connexion with the new Hospital for convalescing smallpox patients, Gore Farm, near Dartford, for the Metropolitan Asylums Board. Messrs. A. & C. Harston, Architects, 15, Leadenhall-street, E.C. No quantities:—

Sugg & Co., Limited	£8,490 0 0
Bailey & Grundy	7,920 0 0
Clements, Jeakes, & Co.	6,828 0 0
Goddard, Massey, & Warner	6,643 0 0
Fraser & Fraser	6,397 0 0
Bradford & Co.	6,310 0 0
W. J. Fraser & Co.	6,290 0 0
Watford Engineering Works	5,885 0 0
Summerscales & Son	5,876 0 0
F. Bird & Co.	5,800 0 0
Stidder, Dairs, & Co.	5,771 0 0
Easton & Anderson	5,710 0 0
Jenkins & Son	5,500 0 0
Porter & Co.	5,465 0 0
P. & F. May	5,400 0 0
Benham & Son,* Wigmore-street, W.	5,250 0 0

* Accepted.

LEICESTER.—For works in connexion with the cutting of a new canal and river channel, and widening and deepening the Union Canal, the making of wharves, new roads, &c., for the Flood Works Committee of the Corporation of Leicester. Plans, specification, and quantities by the Borough Surveyor, Mr. J. Gordon:—

Wm. Webster, London	£59,519 0 0
Geo. Parkinson, Manchester	49,050 10 0
S. Pearson & Sons, London	45,248 17 2
Whitaker Bros., Leeds	39,842 17 10
Holme & King, Liverpool	39,285 3 7
L. Foster, Radcliff-on-Trent	37,632 7 2
Geo. Bell, London	36,754 4 8
Jas. Dickson, St. Albans	35,210 19 10
Jas. Evans, Ealing	34,251 9 6
Jacob Biggs, Birmingham	33,995 10 3
Enoch Tempest, Leicester*	31,973 11 9

* Accepted.

LONDON.—For rebuilding 117, 119, and 121, Newington-causeway, and four houses in Rockingham-street, S.E. Mr. F. A. Powell, architect, 200, Kennington Park-road, S.E.:—

Gregory & Co.	£6,241 0 0
J. Tyreman	6,203 0 0
W. Smith	6,169 0 0
Holliday & Greenwood	6,140 0 0
W. Downs	6,003 0 0
Burman & Sons	5,951 0 0
A. White & Co.	5,769 0 0
W. & F. Croaker (accepted)	5,463 0 0
W. & H. Castle	5,462 0 0

LONDON.—For medical residential college for Guy's Hospital. Messrs. Woodd & Ainslie, architects:—

J. Shillitoe & Son, Bury St. Edmunds (accepted)	£11,453 0 0

[Foundations for above, J. Shillitoe & Son (schedule, accepted).]

LONDON.—For sanitary works, bath, &c., at 30, Fitzroy-square, W., for Mr. H. J. Bradley. Mr. J. H. Martin, surveyor, 83, Albany-road, S.E.:—

Wallden, Walworth (accepted)	£110 0 0

LEYTONSTONE.—For Wesleyan Methodist School and Chapel Extension. Mr. G. Baines, architect, 4, Great Winchester-street, E.C.:—

	A.	B.	C.	D.	E.	
F. & H. F. Higgs	£740 0 0	£2,998 0	£439 0	£630 0	£86 0	£4,893 0 0
H. L. Holloway	760 0 0	2,874 0	393 0	670 0	83 0	4,780 0 0
J. Catley	727 0 0	2,899 0	399 0	620 0	69 0	4,714 0 0
R. G. Battley	676 0 0	2,722 0	546 0	575 0	110 0	4,629 0 0
S. J. Scott	859 0 0	2,721 0	369 0	553 0	105 0	4,607 0 0
J. Hearle & Son	700 0 0	2,770 0	420 0	607 0	75 0	4,572 0 0
Geo. J. Hosking	690 0 0	2,759 0	410 0	597 0	73 0	4,529 0 0
North Bros.	808 0 0	2,588 0	390 0	595 0	106 0	4,487 0 0
James Morter	671 0 0	2,705 0	398 0	585 0	70 0	4,429 0 0
Geo. Dobson	690 0 0	2,635 0	363 0	530 0	80 0	4,298 0 0
F. J. Coxhead	*563 18 6	*2,369 7	346 15	536 15	76 7	3,893 2 6

A.—Extension of Chapel. B.—School. C.—Infants' Room and Kitchen, &c.
D.—Library, Church Parlour, Vestry, &c. E.—Boundary-wall, Fence, and Gates.
* Accepted.

LONDON.—For alterations and repairs to No. 32, Wardour-street, Soho. Mr. R. H. Kerr, architect, 139, Oxford-street, W.:—

J. & J. Greenwood	£541 0 0
Gould & Brand	473 0 0
Manley & Son	380 0 0
J. & J. Feast	375 0 0
Puzey & Lumley (accepted)	350 0 0

[Buckle (late) not stated.]

LONDON. — For alterations and additions to the "Horse and Groom" public-house, Newington-butts, S.E., for Mr. G. J. Flood. Messrs. Lewcock & Grieison, architects and surveyors, 88, Bishopsgate-street Within, E.C.:—

Ivory	£1,066 0 0
Holloway	990 0 0
Spencer & Co.	985 0 0
Hanly	980 0 0
Balaam Bros.	959 0 0
Mower & Son	949 0 0
Stevenson	889 0 0

LONDON.—For new shop-front and repairs, &c., to No. 7, Oxford-street. Mr. R. H. Kerr, architect, 139, Oxford-street, W.:—

Marler & Bennett	£399 0 0
J. & J. Greenwood	354 0 0
Drew & Cadman	329 0 0
J. O. Richardson	267 0 0
Tilly & Jones (accepted)	263 10 0

LONDON.—For new building, North-row, Oxford-street. Mr. E. Burnell, of Bedford-row, and Mr. H. S. Legg, of Christ's Hospital, architects:—

Ashby & Horner	£10,240 0 0
Holland & Hannen	9,836 0 0
Patman & Fotheringham	9,752 0 0
Patrick & Son	9,727 0 0
Hall, Beddall, & Co.	9,600 0 0
Perry & Co.	9,147 0 0
Wall Bros.	8,930 0 0
Clarke & Bracey	8,444 0 0
Chappell	8,079 0 0

LONDON.—For the erection of new factory at the Grange, Bermondsey, for Mr. J. Garnar. Messrs. G. Elkington & Son, architects:—

Wells	£1,399 0 0
Holloway	1,377 0 0
J. & J. Greenwood	1,343 0 0
W. Downs	1,320 0 0
A. White & Co.	1,273 0 0
W. & F. Croaker (accepted)	1,218 0 0

LONDON.—For rebuilding the "Duke of York" public-house, Queen-street, Edgware-road. Mr. J. W. Brooker, architect:—

Garrett	£2,810 0 0
Battley	2,495 0 0
W. Downs	2,468 0 0
W. & F. Croaker	2,419 0 0
J. Beale	2,100 0 0

MONMOUTH.—For additions to Hospital. Mr. F. A. Powell, architect, 200, Kennington Park-road, S.E.:—

Simmons	£185 0 0
C. Morgan	160 0 0
D. Roberts (accepted)	144 0 0

NORTHGATE, GREAT YARMOUTH.—For alterations and additions to Board School. Messrs. Bottle & Olley, architects.

J. P. Knights, Yarmouth	£3,145 0 0
R. Davy, Yarmouth	2,878 0 0
R. Kemp, Gorleston	2,842 0 0
G. H. Springall, Yarmouth	2,780 0 0
Cork & Beech, Yarmouth	2,666 0 0
J. Leggett, Yarmouth	2,595 0 0
T. Howes, Yarmouth	2,584 0 0
Rand & Cooper, Yarmouth	2,569 0 0
Grimble & Watts, Yarmouth	2,520 0 0
J. S. Cooper, Yarmouth	2,475 0 0
R. Eastoe, Yarmouth	2,444 0 0
T. G. Leggett, Gorleston	2,443 0 0
J. H. Hawes, Yarmouth (accepted)	2,440 0 0
J. F. Bray, Yarmouth	2,184 0 0

NOTTING-HILL.—For St. Columb's Mission Church, Notting-hill, for the Rev. Canon Trench. Mr. E. P. Loftus Brock, architect:—

Sabey & Son	£1,690 0 0
Avis & Co.	1,670 0 0
Batchelor	1,620 0 0
Mattock Bros.	1,597 0 0
Dove Bros.	1,575 0 0
Phillips & Son	1,570 0 0
Oldrey & Co.	1,527 0 0
Peters	1,520 0 0
Naylor	1,493 0 0
Allen & Sons	1,395 0 0
Kynoch & Co.	1,395 0 0

PUTNEY.—For pulling down and rebuilding the "Railway Hotel," Putney, for Mr. H. Dobbin. Mr. F. J. Eedle, architect. Quantities by Mr. Charles Barnard:—

T. Grant, Putney	£10,406 0 0
Earle & Son	9,538 0 0
Gregory & Co.	8,775 0 0
Smith	8,751 0 0
J. H. Cox	8,347 0 0
Jackson & Todd	8,159 0 0
Spencer	8,140 0 0
Patman & Fotheringham	7,924 0 0
W. R. Williams, Putney	7,900 0 0
Balaam Bros.	7,820 0 0
R. Aviss & Co., Putney	7,796 0 0

ROTHERHITHE.—For new stabling and dwellings, &c., St. Helena-gardens, Rotherhithe, for Mr. E. W. Robinson. Mr. J. W. Stevens, architect and surveyor, 21, New Bridge-street, E.C.:—

W. A. Rhodes, Kensington	£1,580 0 0
W. & H. Castle, Southwark	1,370 0 0
J. T. Peppiatt, Hoxton	1,235 0 0
S. Chafen, Rotherhithe	1,195 0 0
Prestige & Co., Pimlico	1,185 0 0
A. White & Co., Rotherhithe	989 0 0

SEAFORD.—For the Surrey Convalescent Home, for Mr. Alexander. Mr. Ewan Christian, architect:—

J. Shillitoe & Son, Bury St. Edmunds (accepted)	£10,453	0	0

SOUTH KENSINGTON.—For the erection of a residence, in Thurloe-square, for Mr. J. Whittlesea. Mr. Benyon Tinker, architect, 4, New Inn-chambers, Wych-street, Strand. Quantities not supplied:—

Stimpson & Co.	£2,260	0	0
J. Mears	1,850	0	0
Prestige & Co.	1,756	0	0
Cooke & Battson (accepted)	1,560	0	0

SOUTH SHIELDS.—For works at the new cemetery, Harton, South Shields, for the South Shields and Westoe Burial Board. Mr. D. Balfour, engineer. Houghton-le-Spring:—

J. Lane, South Shields	£6,974	2	10 !
J. Scott, Jarrow	5,946	17	0
W. Roach, South Shields	5,347	0	7
W. Kennedy, Jarrow	4,954	4	0
W. & W. Scott, Newcastle	4,530	9	1
Nicholson & Elliot, Sunderland	4,365	13	5
S. Moody, Tyne Dock	4,180	9	8
T. Dixon, Fence Houses	3,916	0	0
J. Carrick, Durham (accepted)	3,788	10	0 !

SUNDERLAND.—For works in connexion with extending Bishopwearmouth Cemetery, for the Bishopwearmouth Burial Board. Mr. D. Balfour, engineer, Houghton-le-Spring:—

J. Huntley, Sunderland	£7,850	8	0
W. Scott & Son, Sunderland	7,645	9	0
T. Dixon, Fence Houses	7,346	0	0
J. Schofield, Sunderland	6,993	8	0
T. P. Shaftoe, Sunderland	6,971	15	8
J. Elliot, North Shields	6,780	0	0
H. Rudland, Sunderland	6,627	4	0
D. & J. Ranken, Sunderland	6,382	0	0
J. Carrick, Durham	6,257	10	0
R. Hudson, Junr., Sunderland*	6,152	0	0

* Accepted.

SUTTON-IN-ASHFIELD (Notts).—For the erection of a town-hall. Mr. J. P. Adlington, architect, Lincoln:—

Shillito & Son, Bury St. Edmunds	£5,200	0	0 !
Saddler, Nottingham	4,159	1	0
Keeling, Nottingham	3,300	0	0
Perill & Burnett, Nottingham	3,234	6	8
Adams, Nottingham	3,125	0	0
Redwood, Sutton	3,067	10	6
Messom, Nottingham	3,063	0	0
Wheatley & Maule, Nottingham	2,996	10	0
Cowen, Lincoln	2,956	2	0
Perks, Long Eaton	2,956	0	0
Greenwood, Mansfield	2,910	0	0
Hind, Nottingham	2,887	0	0
Clark, Nottingham	2,877	0	0
Price, Nottingham (accepted)	2,851	0	0 !

TOTTENHAM.—For alterations and additions to premises, High Cross, Tottenham, for Mr. D. Quigley. Mr. J. W. Couchman, architect. No quantities:—

Wilson & Stickley	£615	0	0
Knight & Son	456	0	0
Percival Hart (accepted)	394	0	0

TWICKENHAM.—For the erection of Church Institute, Twickenham. Messrs. George Lansdown & Harriss, architects, Warwick-street, Charing Cross:—

Messom	£1,662	0	0
W. Downs	1,660	0	0
Lane	1,589	0	0
H. & E. Lea	1,554	0	0
Oldridge	1,511	0	0
J. Tyerman	1,470	0	0
J. T. Collinson (accepted)	1,408	0	0

UPPINGHAM.—For the erection of new school-house and class-rooms, for the trustees. Mr. T. G. Jackson, architect, 4, Nottingham-place, W.:—

Dobson	£10,975	0	0
Herbert	10,040	0	0
Thompson	9,988	0	0
Shillitoe & Son	9,565	0	0
Willcock	9,274	0	0
Roberts	9,164	0	0
Estcourt	8,948	0	0
Halliday	8,900	0	0
Parnell (accepted)	8,895	0	0

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TO CORRESPONDENTS.

W. B. D. (hardly to the point).—J. B. (we are obliged to decline pointing out books; see standing notice to that effect below).—"A Constant Reader" (as we have replied to many other similar inquiries, it would be impossible to advise to any purpose except after an examination of the work. All we can suggest is that the cement may have been of inferior quality, and have shrunk and cracked; a very fine crack, hardly noticeable, would do the mischief; and it may have been finished level and with no fall, which in the case of a crack would make matters worse).—A. & C. H.—W. T. M. (we will certainly do nothing of the kind).—A Yorkshireman (no space this week. Letters of any length should not be sent at the last moment.—W. R. (ditto).

All statements of facts, lists of tenders, &c., mus be accompanied by the name and address of the sender, not necessarily for publication

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

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Addressed to No. 46, Catherine-street, W.C.

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SPECIAL.—ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY mornings;

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

PERSONS Advertising in "The Builder," may have *Replies addressed to the Office, 46, Catherine-street, Covent Garden, W.C. free of charge.* Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage

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Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 42, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, graneries, tun-rooms, and terraces. [ADVT.

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Seyssel, Patent Metallic Lava, and White Asphaltes.
M. STODART & CO.,
Office:
No. 90, Cannon-street, E.C. [ADVT.

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STATIONERS, &c.,
Keep a Special Stock of Sundries for Professional Offices.
22, Martin's-lane, Cannon-street, E.C. [ADVT.

S. L. WILLIAMSON,
PEWTERER, LICENSED VICTUALLERS' BAR FITTER, BEER ENGINE MAKER, BRASS FINISHER,
328, MILE END ROAD, LONDON, E.
Contractor to Her Majesty's Government.
Estimates given on application.

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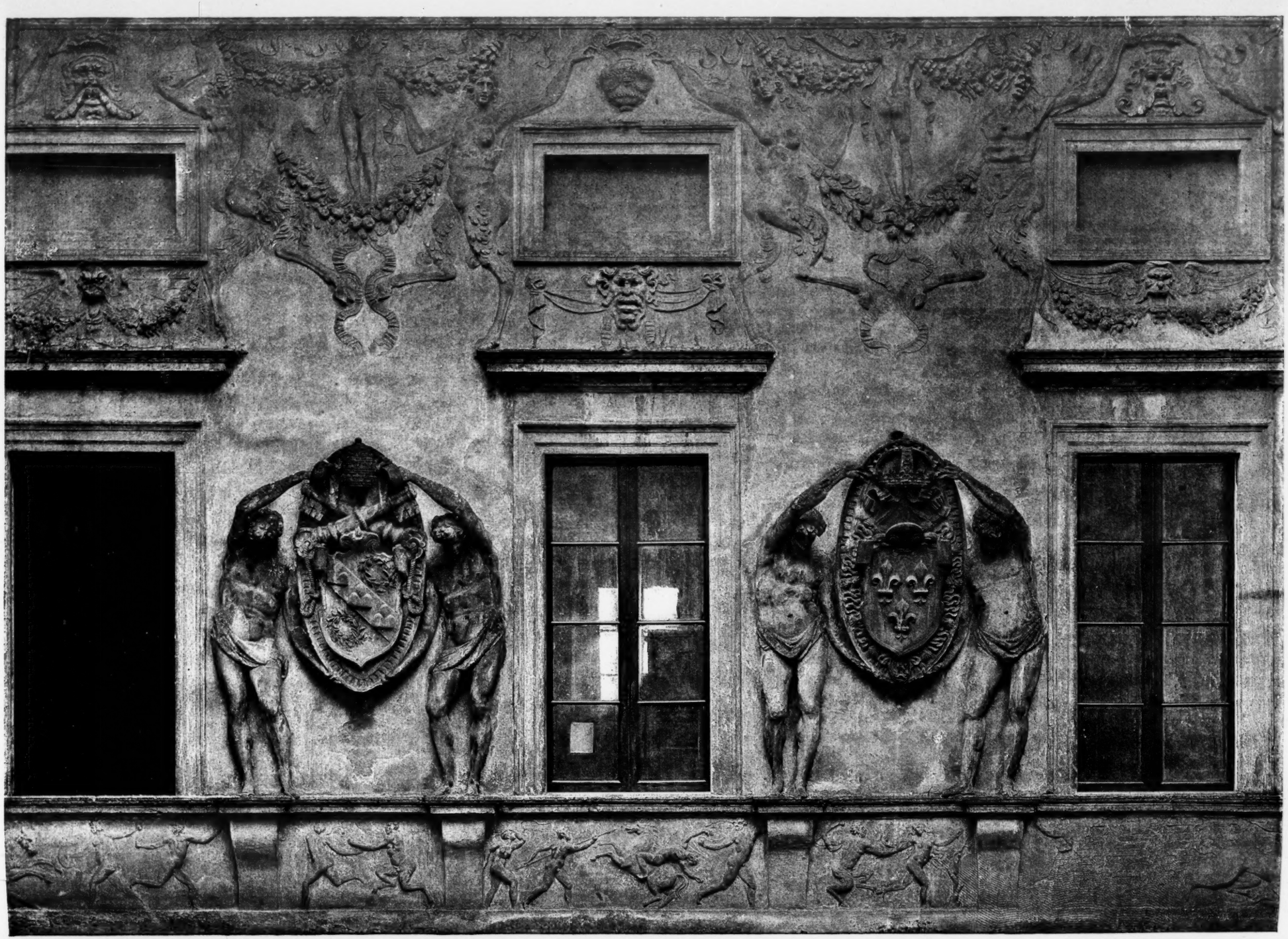
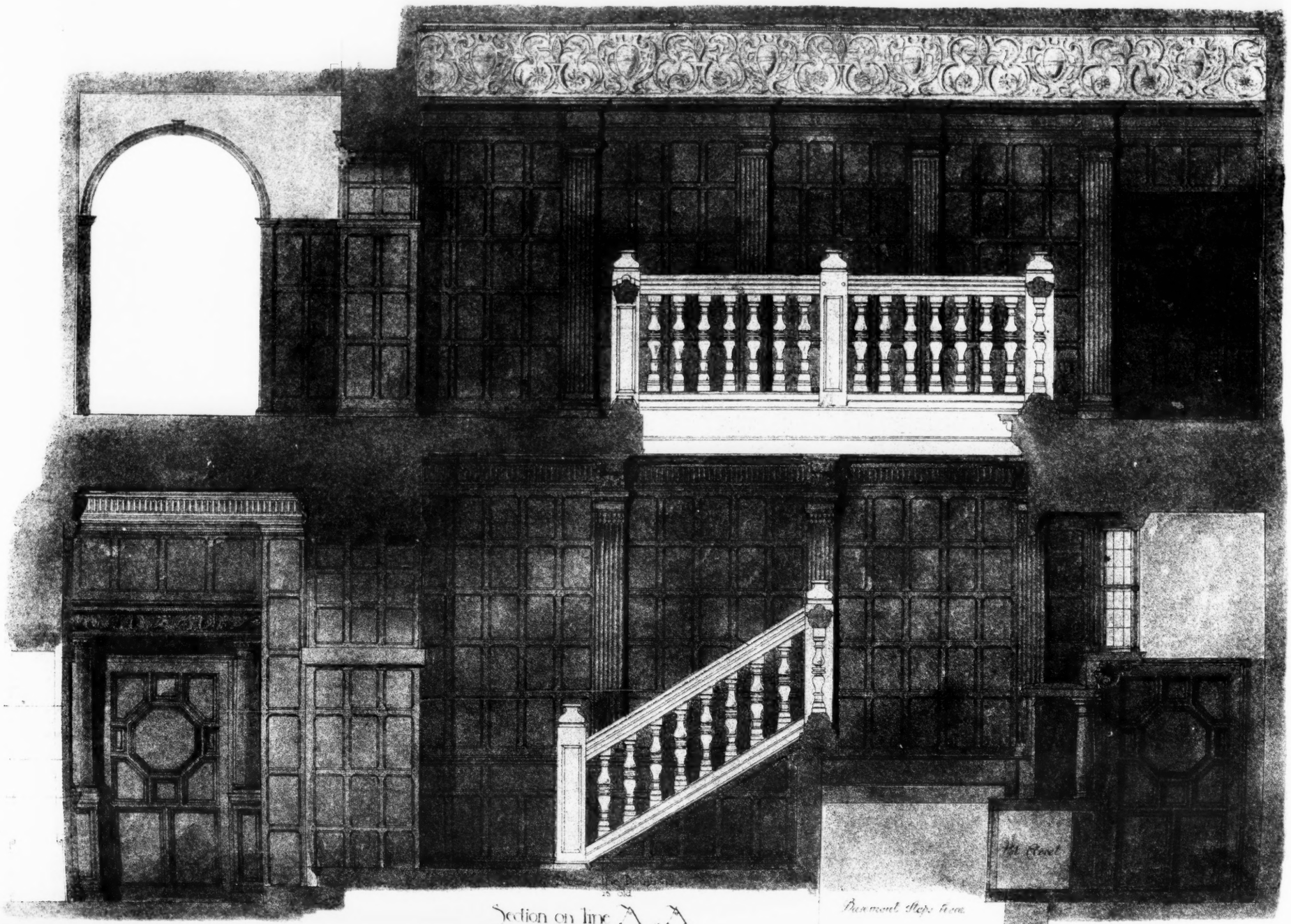


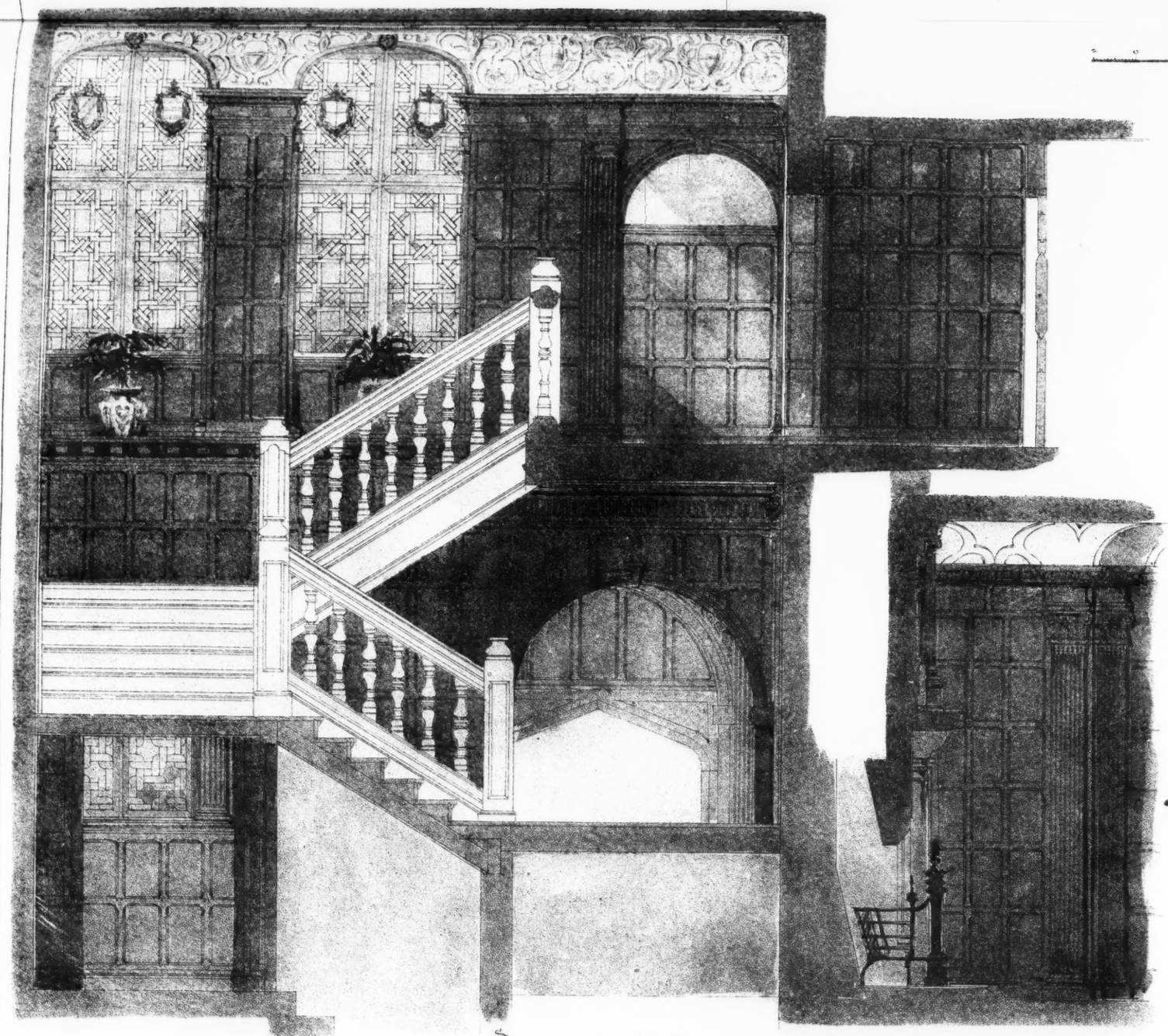
SPADA PALACE, ROME. PORTION OF FAÇADE TOWARDS COURTYARD.

The Phototype Co., 308, Strand, London.

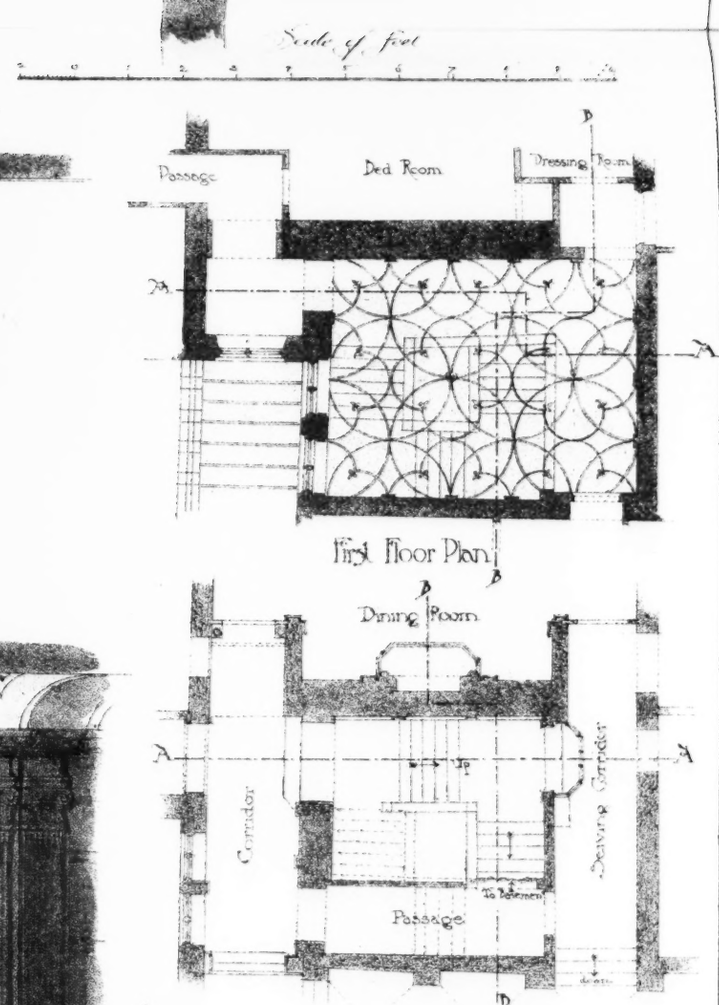
The Phototype Co., 366, Strand, London.

PART OF MONUMENT, CHURCH OF SAN GREGORIO IN MONTE CELIO, ROME.


Section on line A A
Basement Steps from
Scale of feet



Section on line B – D



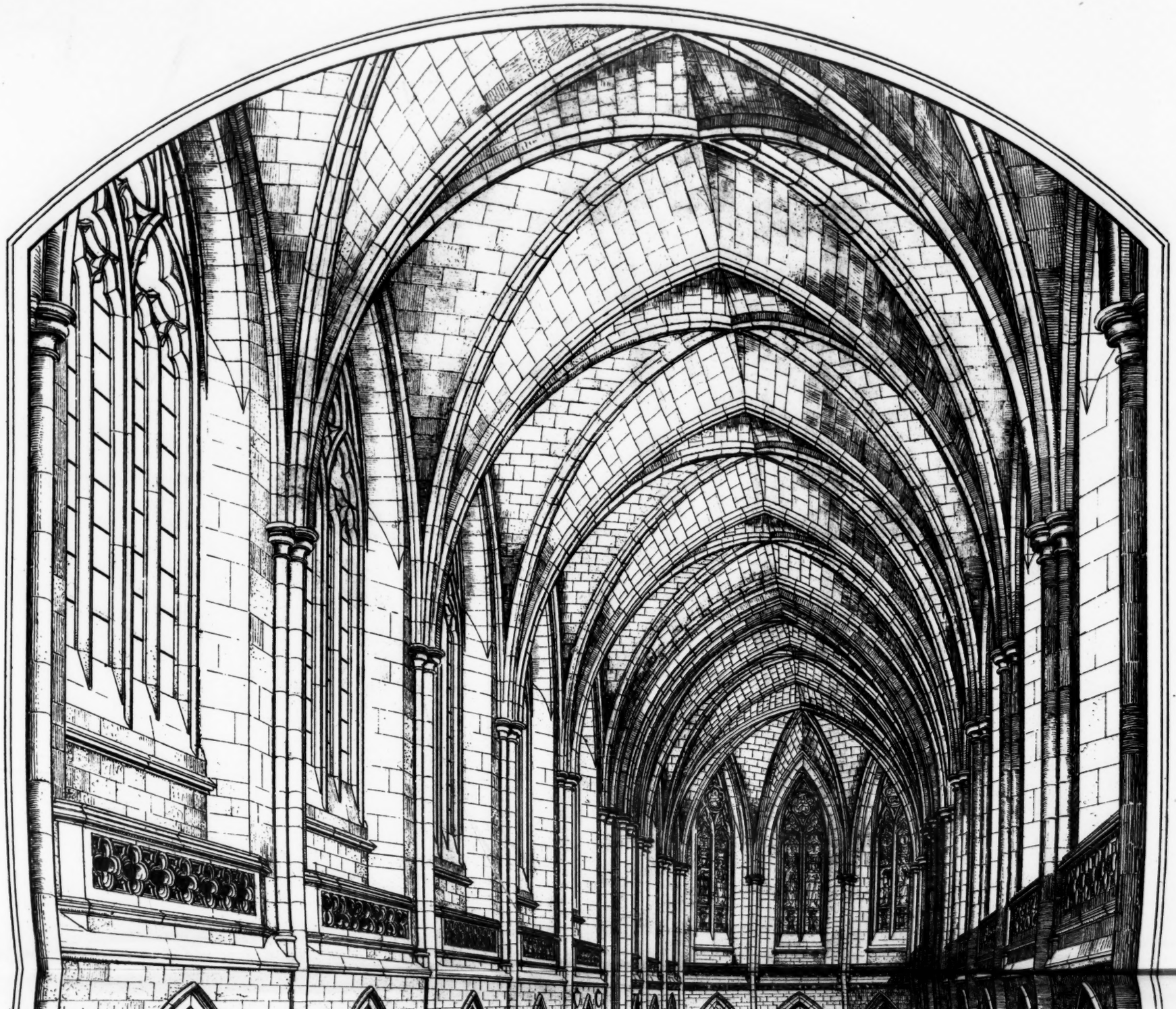
First Floor Plan

Ground Plan

Stowell Park
Gloucestershire.
The Principal Staircase

John Belcher
Architect

INK PHOTO. SPRAGUE & Co. 22 MARTINS LANE, CANNON ST. LONDON E.C.



TEDDINGTON: NEW PARISH CHURCH

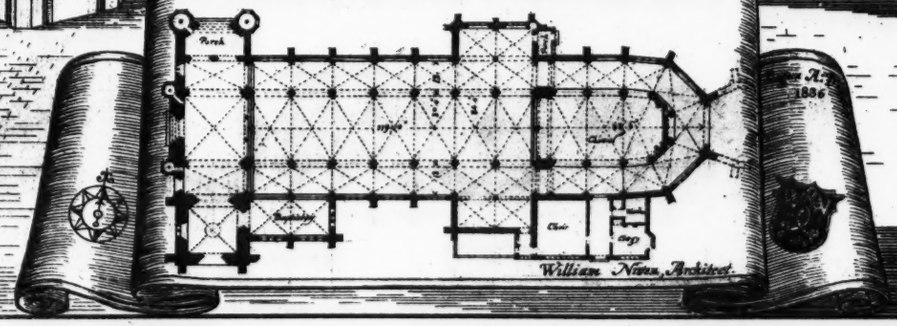
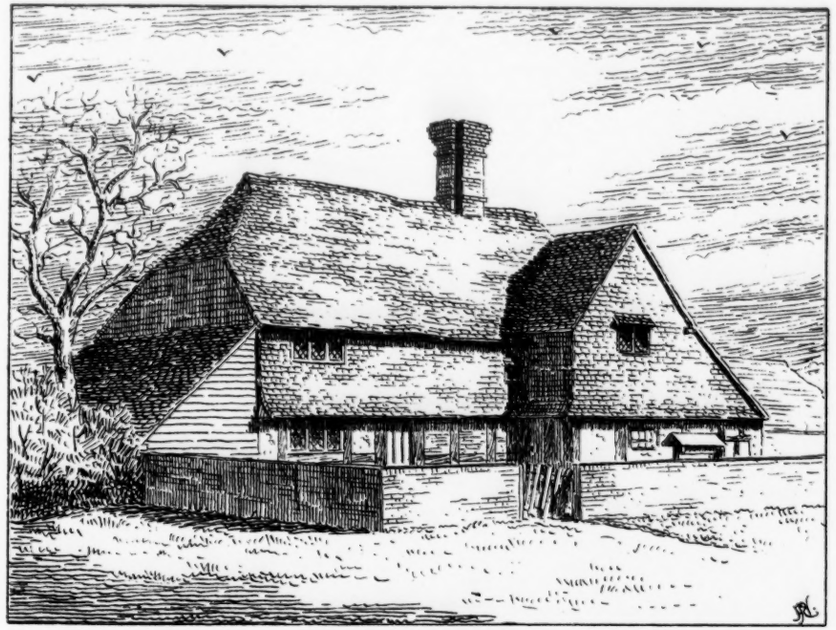


PHOTO-LITHO, SPRAGUE & Co 22, MARTINS LANE, CANNON ST, LONDON, E.C.

AT CRANLEIGH.



DUNSFOLD COMMON.

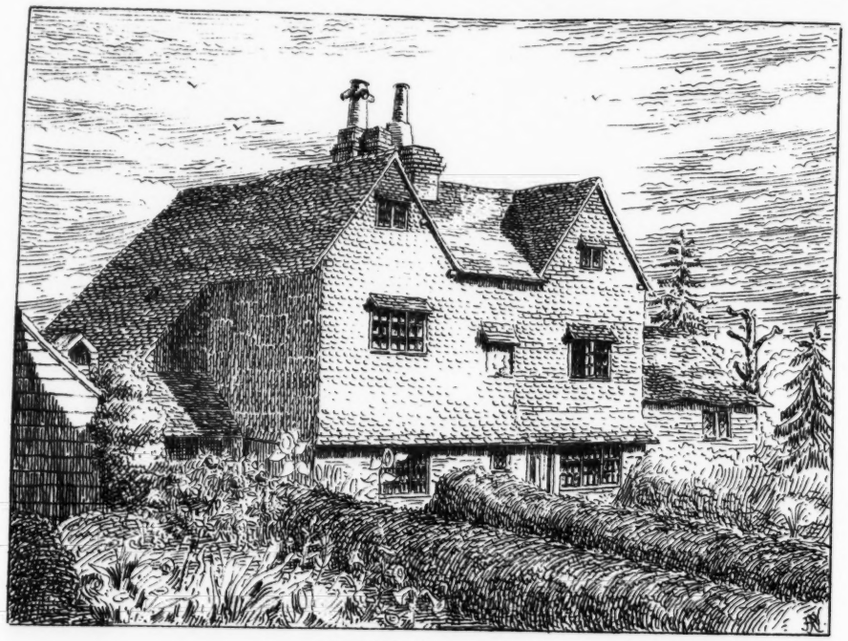
FIELD PLACE, DUNSFOLD.

BURNINGFOLD.

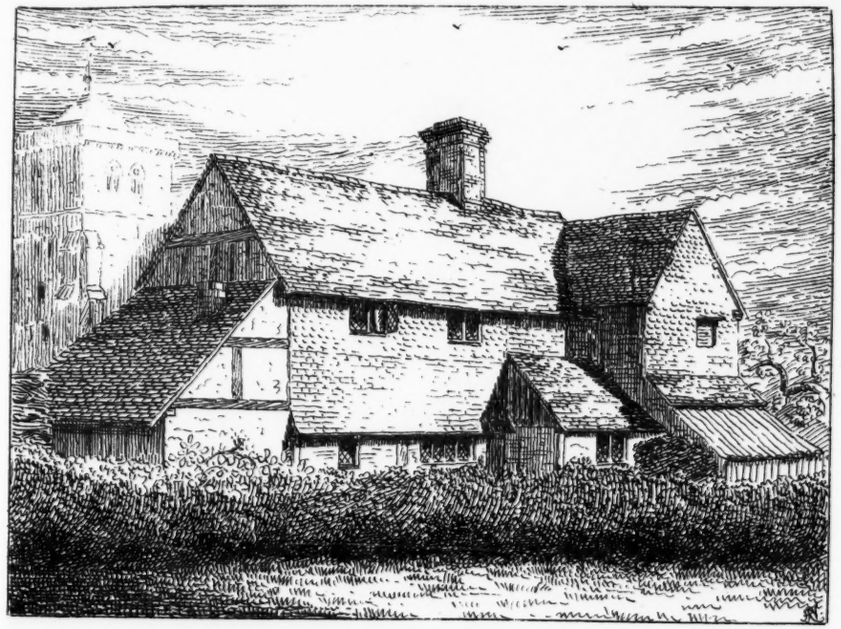
PHOTO-LITHO, SPRAGUE & Co 22, MARTINS LANE, CANNON ST, LONDON, E.C.

OLD COTTAGE ARCHITECTURE.—From Sketches by Mr. Ralph Nevill, F.S.A.

THE BUILDER, SEPTEMBER 29, 1888.

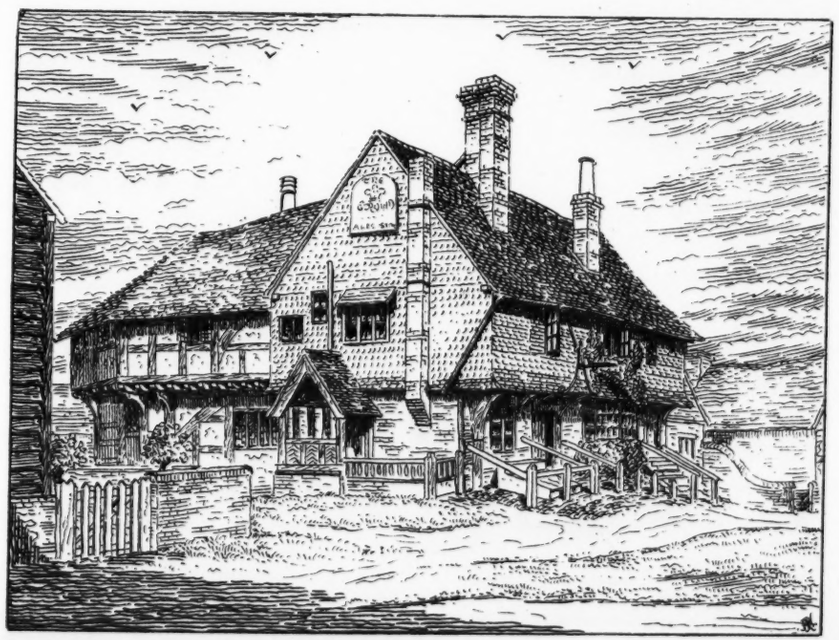


AT CHIDDINGFOLD.



AT CHIDDINGFOLD.

COMBE FARM



THE CROWN, CHIDDINGFOLD.

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OLD COTTAGE ARCHITECTURE.—From Sketches by Mr. Ralph Nevill, F.S.A.